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A Novel Combination Furnace for Making Steel

The Side-Blow Converter, Open-Hearth and Electric Processes Are Employed, But Either of the Latter Two Methods Can be Eliminated for Finishing

An exceedingly ingenious furnace for producing steel, which combines the side-blow converter, open-hearth and electric processes, designed by E. Cooper Wills, general superintendent and constructing engineer, has been installed in the plant of the Morris Iron & Steel Co., Frederick, Md. The furnace is so constructed that steel can be made by the three processes combined, or by the side-blow converter or the electric. As shown in the accompanying illustrations, the furnace is cylindrical in form, 14 feet long and 8 feet 10 inches in diameter. The entire melting medium is so mounted that it may be tilted or rolled backward and forward to facilitate the converter steel-making process and also for tapping the metal from the furnace. The charging and pouring side is illustrated in Fig. 1, which also shows the three-horsepower electric motor that operates the tilting mechanism, consisting of triple screw gearing. It will be noted that a ladle pit is provided in front of the furnace, and to enable the charging and pouring trough to swing through an arc during the various furnace manipulations a rectangular pit leads into the ladle pit in the foreground. The metal first is melted in a cupola shown at the left and is charged into the furnace through the same trough through which the steel is tapped.

The opposite side of the furnace is illustrated in Fig. 2. The dome, A, through which gas is admitted when the furnace is operated on the open-hearth principle, also serves as the nose or spout while the furnace is operating as a side-blow converter. The blast box and tuyeres are illustrated at B, C is the downtake pipe and D is the blast pipe. The stack is shown at the right. The furnace chamber rolls on V-shaped plates. The downtake pipe, C, is brick-lined and is bolted to the furnace. This pipe is of a radius which maintains it constantly central in the gland connection when the furnace is tilted or rolled backward and forward during the steel-making operations. Ports are located on either side of the hearth section on a level with the surface of the metal, and the gases after passing through reversing

FIG. 1—CHARGING AND POURING SIDE OF THE WILLS COMBINATION SIDE-BLOW, OPEN-HEARTH AND ELECTRIC FURNACE

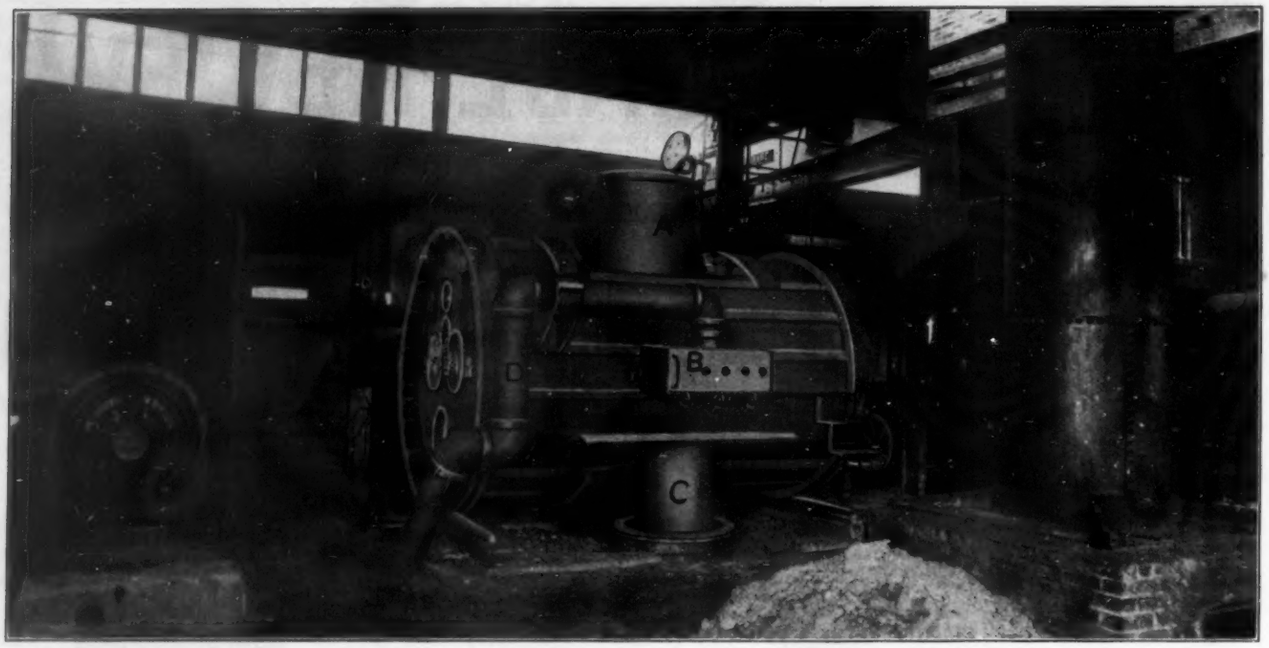


FIG. 2—OPPOSITE SIDE OF THE WILLS FURNACE, SHOWING THE WIND BOX AND TUYERES, DOWNTAKE AND BLAST PIPE

valves, are led to the stack. On each end of the furnace opposite the ports are openings through which scrap and other raw materials are charged and each end of the furnace is provided with a slag pocket.

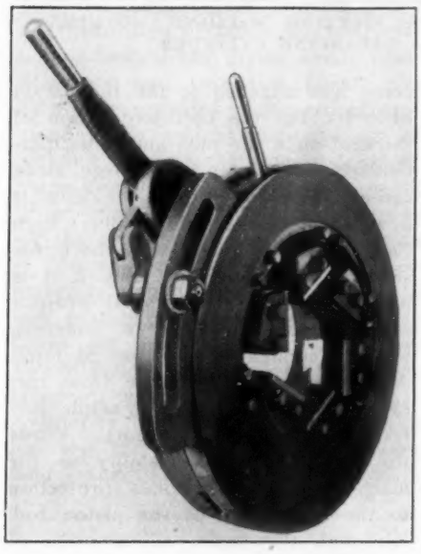
The wind box is provided with a valve which shuts off the air from the tuyeres while the furnace is being operated as an open-hearth. This prevents the gas from working through the tuyeres to the blower and aids in centralizing the combustion of the gas on or near the surface of the metal. The gas is introduced through a door on top of the dome and when the furnace is being operated as an open-hearth, the dome section serves as a combustion chamber. In the accompanying illustrations this door is shown raised, being in this position during the side-blow converter operation. However, when the furnace is to be operated as an open-hearth, this door is lowered and the gas is introduced through it to facilitate the further refining operation. The reversing valves, which are of brick construction, are 14 inches wide, 16 inches long and 4 inches thick. They are placed horizontally in the furnace flues and are connected to the reversing mechanism by steel bands. When the steel is to be finished by the electric process, all air is excluded and the door on the dome, the ports and the tuyeres are closed. Two sets of electrodes then are introduced into the bath, which effect the refining operation. The tuyeres point downwardly and are set at an angle of 10 degrees from the horizontal. The hearth is so constructed that when air at approximately three pounds pressure is intro-

FIG. 3—END VIEW OF THE WILLS COMBINATION FURNACE, WHICH SHOWS THE SWITCHBOARD STAND AT THE LEFT FOR CONTROLLING THE ELECTRODES

duced, the metal at the point of contact with the air is raised to a high temperature and is driven across the hearth to the opposite side. This imparts a rolling action to the metal in the furnace and facilitates the removal of impurities. As the side-blow converter process costs less per ton of steel than the open-hearth, it is employed to prepare the steel for its final refining by the open-hearth or electric processes.

It is claimed that test bars shaken out of the sand without annealing can be bent without fracture 1½ times through a circle less in diameter than the width of the bar. Steel scrap can be employed in amounts varying from 20 to 80 per cent of each charge.

The first heat recently made consisted of 75 per cent of pig iron and 25 per cent of steel scrap. The pig iron analyzed as follows: Silicon, 1.87 per cent; phosphorus, 0.029 per cent; sulphur, 0.024 per cent; graphitic carbon, 3.55 per cent; combined carbon, 0.59 per cent; copper, 0.69 per cent and manganese, 0.08 per cent. The cupola charge consisted of 6,150 pounds of metal and the steel tapped from the furnace totaled 5.560 pounds. The only alloy additions consisted of 50 pounds of ferro-manganese. A test bar cast from this heat had the following physical properties: Elastic limit, 44,470 pounds per square inch; ultimate strain, 65,240 pounds per square inch; elongation in 2 inches, 0.74 inch; elongation per cent of length, 37; percentage of reduction in area, 64.40. Steel from this heat contained carbon, 0.12 per cent.



LANDIS SIX-CHASER DIE HEAD

The furnace also can be used for making malleable iron. When the carbon in the metal is practically all in the combined state and after the greater portion of the silicon has been removed, the metal is similar to malleable, and when annealed, it possesses all of the desirable properties of high grade malleable iron. It is claimed that various alloy steels can be made in this furnace by the addition of manganese, nickel, tungsten, etc., which should be charged in the molten state.

When operating the furnace, gas is admitted through the cover in the dome and the iron from the cupola is charged through the pouring trough. The gas then is shut off and air is admitted through the tuyeres at a pressure of from 3 to 3½ pounds for a period of approximately 20 minutes to complete the conversion of the iron into steel by the side-blow converter process. The tuyeres then are closed and the steel is further refined either by the open-hearth or electric process. Blast is furnished by a Paxson-Green blower operated by a 75-horsepower General Electric motor. At a recent meeting of the Philadelphia Foundrymen's Association, Mr. Wills described his process and exhibited numerous steel castings and bent and twisted test bars made from this steel, which had not been subjected to annealing.

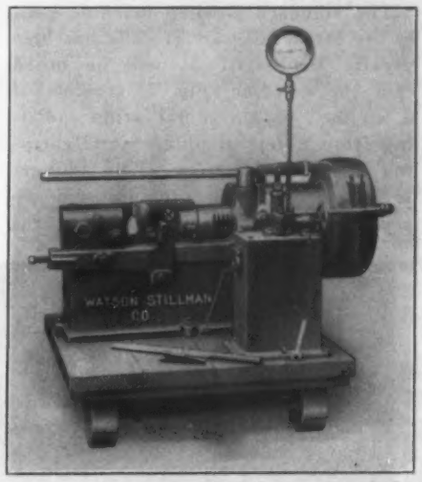
Landis Die Head

A six-chaser, stationary pipe die head designed and manufactured by the Landis Machine Co., Waynesboro, Pa., applicable to pipe machines of the rotating pipe type, is shown in the accompanying illustration. The head is composed of four principal parts, including the body which carries the chaser slides, the operating ring which imparts the oscillatory motion of the handle to the chaser slide, the chasers and the chaser slides. It is claimed that the line contact of the chasers with the work reduces friction to a minimum and permits of high cutting speed. This increase in speed is augmented by the flexible rake feature which makes it possible to obtain the best cutting conditions and to successfully thread all kinds of pipe, including iron, steel, brass and copper. The cutting contour of the die is always the same, owing to the fact that the chasers are ground on their inner ends and never on the bevel surfaces which form the throat. During a recent test made in the plant of a large eastern pipe mill a circumferential cutting speed of 40 feet per minute was maintained.

Inasmuch as one set of dies covers the entire range of all sizes of standard pipe having the same pitch, it is unnecessary to remove the chasers from their holders except for grinding purposes. The removal of the chasers is effected by slackening the two clamping screws on each chaser holder a sufficient amount to permit the chasers to be slipped from their seats. The chasers are set to the proper position by bringing their cutting edges flush with the flat surfaces on the chaser slides. A steel scale or a straight edge will simplify this operation. Clamps overhang the chasers and protect them against split and twisted pipe. The chasers are interchangeable.

Hydraulic Shear for Cutting Cables

For cutting steel cables up to 4½ inches in diameter or correspondingly large sizes of rolled steel, a horizontal shear, having a capacity of 175 tons, is now being built by the Watson-Stillman Co., 50 Church street, New York City. Because of its weight this shear is mounted on wheels, as shown in the accompanying illustration, to render it convenient for use in machine shops, iron and steel plants, ship yards, etc. The pump is independent of the cylinder and in shops equipped with an hydraulic system the hand pump may be eliminated and direct connection can be made to the high pressure pipe line.



HYDRAULIC SHEAR FOR CUTTING 4½-INCH STEEL CABLES

The ram and cutter are guided by a machined groove to insure accurate shearing. After the ram has made its cutting stroke, the pressure is released by turning the hand wheel on the pump and the ram is returned by the rack, pinion and lever arrangement. The teeth of the rack and pinion are protected from excessive stresses due to the jump of the ram at the instant of rupture by mounting the pinion upon a spring. The gage, directly connected with the pipe line, indicates the exact pressure at all times.

The Mesta Pickling Machine

To provide clean surfaces on metals that are to be enameled, plated or galvanized, it is essential to have them pickled before subjecting them to the finishing treatment. In the pickling machine built by the Mesta Machine Co., Pittsburgh, the material to be cleaned is moved through the acid with a pre-determined velocity and only a slight jarring movement. The latter separates the sheets, if this material is being pickled, a sufficient length of time to permit the acid to enter between the sheets and prevents them from sticking to each other. The washing action of the acid in conjunction with the loosened scale has a scouring effect which thoroughly cleans the sheets. The uniform action of the acid upon the surface is aided by the thorough agitation of the pickling solution which prevents the formation of acid layers of different densities.

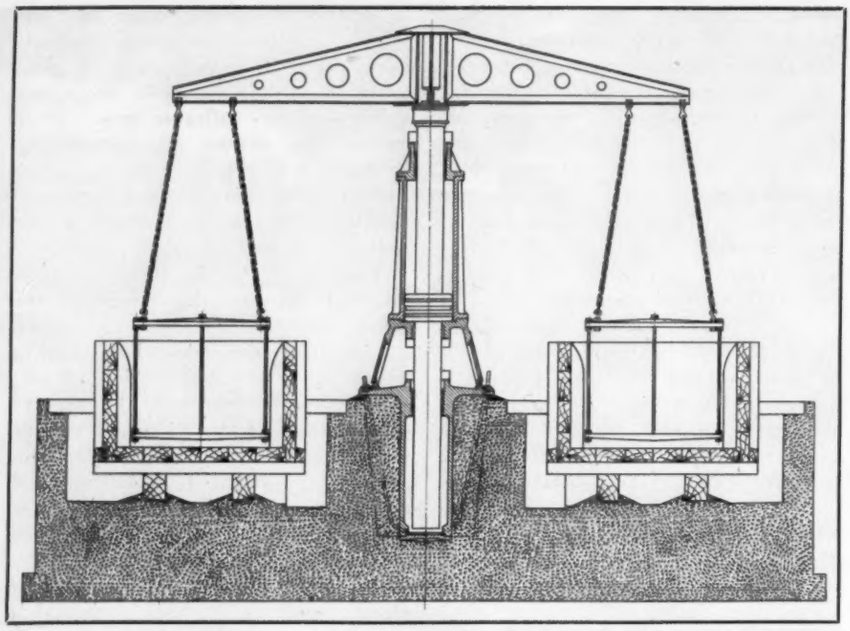


FIG. 2—CROSS-SECTION OF LOW-TYPE PICKLING MACHINE, SHOWING METHOD OF SUPPORT AND BALANCING CYLINDER

The standard pickling machine built by the Mesta company recently has been greatly improved. It will be noted that the machine, Fig. 1, consists of a number of horizontal arms radiating from a central plunger and carrying acid proof crates. The plunger is raised by steam pressure and descends by gravity. For raising the crates out of the vats a lever is depressed and the crates containing the material to be removed from the solution are drawn aside. Additional crates then are moved into position over the vats and are lowered into the solution by another movement of the lever. In former types the machine was attached to the foundation by bolts, but the corrosive action of the acid upon the nuts and bolts, particularly in machines of large sizes, caused them to vibrate, making it necessary to adjust the nuts from time to time. As shown in the cross-section of the machine, Fig. 2, it is provided with an additional projecting cylinder imbedded in concrete, thereby eliminating the use of foundation bolts. Ribs radiate from this cylinder, thereby affording ample surface for additional support. While the cylinder affords stability to the machine it also provides protection to the lower part of the piston rod. Although the steam consumption of the machine, as previously built, was low, nevertheless in plants where steam is an important item, the new design affords an opportunity for greater economy in this direction. By filling the bottom cylinder and the interior of the piston rod with compressed air, a large part of the dead weight of the machine can be balanced and, therefore, a much smaller quantity of steam is required for lifting the loaded crates. This air is never exhausted, being constantly retained in the cylinder. An air compressor of small capacity is of ample size to supply the air lost by leakage.

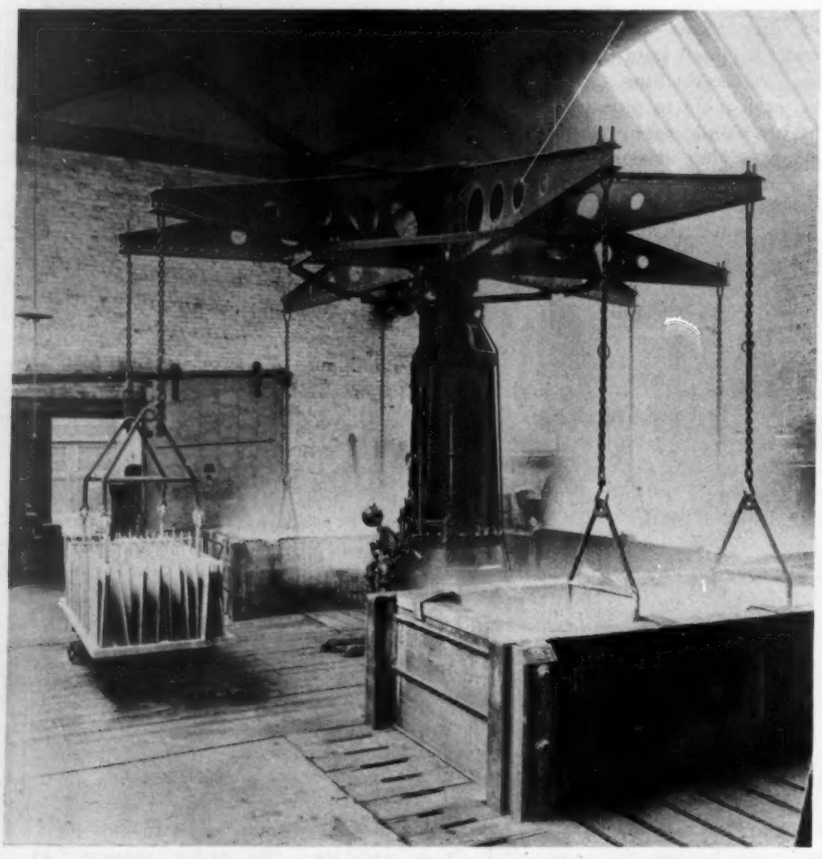


FIG. 1—MESTA LOW-TYPE PICKLING MACHINE

Originally this pickling machine was provided with an overhead bearing attached to some part of the building, frequently to the roof truss. The bending action caused by the uneven loading of the radial arms was transmitted to the building when attached to the roof truss and the machine frame, being relieved of the bending

stresses, therefore, was made considerably lighter. However, this construction had its disadvantages, as no overhead crane could pass the machine and any movement of the building due to temperature changes or settling caused the overhead bearing and the steam cylinder with its piston to wear. For this reason the Mesta Machine Co. discontinued building the machine with an overhead bearing except when specifically specified.

New Plant of the Mead-Morrison Mfg. Co.

By A W Howland

The Mead-Morrison Mfg. Co., whose Cambridge, Mass., works were destroyed by fire Dec. 26, 1912, is building a new plant in East Boston which will have approximately twice the capacity of the old one. This is equipped with machinery for the manufacture of coal-handling apparatus, conveyors and transporters, grab buckets, steam and electric hoists.

The machine and erecting shops, which are under one roof and together comprise the largest building, have a ground area of 220 x 327 feet, with a high central bay giving ample crane clearance and two side bays. The latter are provided with vertical sawtooth roofs which admit plenty of air and light at the side, and at the same time keep out rain and snow. Prism glass, for the effective diffusion of the sunlight, is used in the panes.

The walls of the shop are brick on concrete foundations, but about 60 per cent of the wall area consists of glass set in steel sashes. For the lower panes, the glass is left clear; above them, it is ribbed.

Interior columns are all steel, supporting the usual structural girders and crane tracks. The machine shop is spanned by three Shaw cranes, one above another, the clearance being 27½, 23 and 19½ feet, respectively.

The equipment includes Johnson, Jones & Lamson, Flather, New Haven, Whitcomb-Blaisdell, Gridley, Davies, Bullard and American lathes; Putnam and Gray planers; King, Betts, Barrett and Bullard boring mills, Gisholt turret machines, Betts slotters, Newton keyseaters; West, Baush and Simplex drills, and a variety of milling machines, gear cutters, grinders, etc. Many of the tools are necessarily large in size and designed for rapid production.

Plate Shop Equipment

The plate and structural shop has a monitor roof. It is served by a single Shaw crane allowing 37½ feet headroom. A gallery for template-making, etc., extends along one side and provision is made for a second gallery on the opposite side.

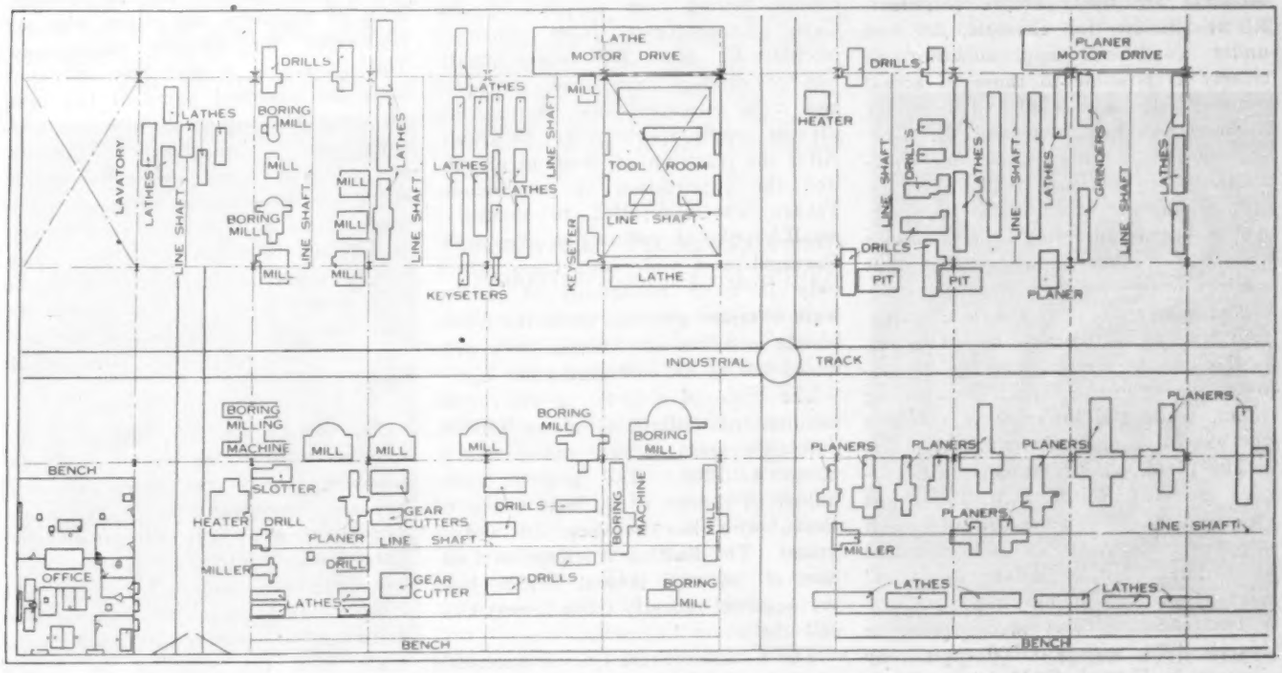
The equipment of this shop is thoroughly modern, comprising a full complement of appliances and tools for plate and structural work. It includes the necessary furnaces, blowers and exhaust fans, hammers, bulldozers, flange blocks, etc., in the forging and flanging department, together with layout tables, bending rolls, shears, punches, drills, blower, heaters, riveters and auxiliary machine tools in the boiler and plate work section.

Industrial tracks bisect the building in each direction, so that they extend both parallel with and at right angles to the crane. The spur from the railroad also extends through both the machine and plate shops at one end, so that heavy material can be handled by the cranes from and to cars.

The openings for railroad tracks in the walls of the shop are closed by two-leaf vertical slide doors, while entries to passageways have swinging doors.

At one end the walls of the shop are temporary in character and these can be removed to permit the extension of the buildings and crane runways when the increase of the business demands still further enlargement of the company's manufacturing facilities.

Electric drive is used throughout. All of the heavier machines have motors direct-connected, while the light-



ARRANGEMENT OF TOOLS IN THE MACHINE SHOP OF THE MEAD-MORRISON MFG. CO.

er tools, grouped as nearly as possible in 50-horsepower units, on the basis of average load, are operated by belts from counter-shafting.

As far as practicable, the tools have been arranged so that the work does not cross itself, but moves only in a forward direction from the receiving door to the erecting floor.

The power house is laid out for five water tube boilers of 300-horsepower each, two of which have been installed, and steam from these is supplied to two steam-driven electric units, as well as to a compressor furnishing air to the pneumatic tools in the shop.

The heating of the plant is accomplished by means of the Sturtevant low pressure system of hot air and fans.

A comprehensive tool room record is maintained. Each machinist is given a key to his bench or box and one to his locker, together with a tool check. For these he makes a suitable deposit. When in need of a tool for the machine he is operating, he presents his check at the tool room. There the man or boy in charge gives him the tool wanted and hangs the check in its place until returned. By this means the location of every tool is known at all times. The same is true of jigs and other devices intermittently used; but all such, on their return, are first sent to the tool shop for inspection before replacing in the rack. The tool-making and sharpening department is conducted independently, and the machinists are not allowed to grind tools or otherwise put them in condition themselves.

Thorough tests of the company's products are made before shipment. Electric hoists, for example, are run under conditions approximating as closely as possible to those of actual service, both as to kind and character of current, voltage, etc., and the varying degrees of load, including overloads.

Accidents are cared for in an emergency ward adjoining the machine shop, where there is a cot and "first aid" outfit.

The upper floor of the administration building, a structure 60 x 110 feet, is devoted to the engineering department, including a spacious drafting room, while the lower floor contains the executive and sales offices.

The plant, when complete, will employ upwards of 1,200 men. The shops described have been finished and all of the new equipment for them installed or ordered; but a pattern shop and foundry are still to be built.

The company was incorporated in March, 1904, with $500,000 capital, by Eugene N. Foss, J. G. Morrison, W. S. Martin and A. P. French. In 1906 it was consolidated with Rawson & Morrison and the capital increased to $1,000,000.

Plans for the new plant were made by Hollis French and Allen Hubbard, architects and engineers, of Boston, and its erection has proceeded under their supervision. A feature of the construction has been the use of reinforced concrete piles for the foundations of all the buildings and the laying throughout the shops of concrete floors with granolithic finish. The roofing, for all flat surfaces, is tar and slag, and for inclines, asphalt and slag.

New Radium Sources of Supply

In an effort to locate a supply of vanadium ores in this country, the Crucible Steel Co. of America, Pittsburgh, sent a corps of engineers to Colorado to prospect that territory and large deposits of vanadium were found in Paradox valley in the southern section of that state, which proved to contain not alone a large tonnage of vanadium, but also uranium ore. From the latter radium is produced and it is believed that this is the richest radium bearing field in the world. Up to this time there have been only two sources of supply of radium, both from pitchblende residues. One source of supply was found in Colorado and the other was in Austria. The exportation of Austrian radioactive ore, however, has been prohibited by that government. From 1889 to 1904 only two or three grams of radium were extracted from 13 tons of pitchblende residues, the radium having been supplied by the Curie Laboratories from Austrian pitchblende. Since 1904 larger quantities of radium have been extracted and it is estimated that the world's present supply approximates 40 grams. After the Austrian government prohibited the exportation of pitchblende, France was compelled to secure a small supply of radioactive ores from Portugal and Colorado, from which only ½ to 5 milligrams of radium were obtained per ton, while the pitchblende residues of Austria have produced 100 to 200 milligrams per ton.

The price of a gram of anhydrous bromide of radium is about $70,000, making a gram of pure radium worth about $120,000. The present chief holder of radium is Madame Curie, of Paris, who has between 2.6 and 3 grams. The Radium Institute, of London, is the next largest holder, having acquired recently from Ernest Cassell the gram he owned.

The Crucible Steel Co. of America's chief interest in its Colorado deposits lies in the development of high speed tool steel in which vanadium, uranium and such rare elements are used, the product being a steel of great value in the arts because of its exceptional cutting qualities. Some months after the Crucible Steel company had secured this large body of radioactive ore in Colorado, Dr. Charles L. Parsons, chief of the division of mineral technology, United States bureau of mines, Washington, conceived the idea of producing a larger quantity of radium than is now available for use in scientific, medical and surgical work. Dr. Parsons, together with representatives of Dr. Howard A. Kelly, of Johns-Hopkins University, Baltimore, and Dr. James Douglas, of New York, who had agreed to furnish the necessary funds, visited Pittsburgh to make arrangements with the Crucible Steel Co. of America to secure a large quantity of its Colorado uranium ore. Appreciating the motives actuating the proposed formation of the National Radium Institute, the Crucible Steel company generously agreed to provide 1,000 tons of uranium ore to the institute. Thirty tons already have been shipped from one of the company's Pittsburgh warehouses, while the balance is now going forward from its Colorado mines. The Crucible Steel company reserves for itself only the vanadium and uranium values contained in the ore.

A Controller Parts Cabinet

To facilitate repair service on elevator controllers, the Otis Elevator Co., New York City, has designed a controller parts cabinet for the convenience of engineers and others who are responsible for elevator maintenance. This cabinet is a steel box and contains the essential parts of the type of controller furnished with the elevator machine installed. The cabinet may be hung on the wall in the engine room and the engineer, when necessary, may replace a worn part of the controller, and by referring to the catalog on the inside of the cabinet cover, he may order the new part to replace the part removed, thereby keeping the cabinet complete for repair work at all times.

The Bristol Co., Waterbury, Conn., has taken over the business of the Goodwin Hollow Set Screw Co. and has made arrangements for the manufacture of set screws with dove-tailed slots formerly produced by the Goodwin company. Improved facilities for manufacturing set screws will be provided and shipments are now being made from the plant of the Bristol Co.

Welding Large Rolling Mill Pinions

Serious shutdowns accompanied by loss of time and money are not uncommon in steel mills from pinion breakage. On account of the severe duty imposed on a modern rolling mill, it is almost impossible to design or manufacture pinions which will always stand up. Broken necks and stripped teeth are among the most common forms of failure. A prominent steel company in Ohio has found that it can repair stripped teeth by thermit welding, thus reclaiming pinions which otherwise would be scrapped. The accompanying illustrations show how several broken teeth in a large pinion were replaced. The pinion was approximately 10 feet long and 40 inches in diameter with extension bearings 22 inches in diameter at each end. The teeth were about 9 inches in circular pitch.

In making the repair, it was first necessary to cut into the pinion to a depth of about two inches and to a width corresponding to the base of the broken tooth. A wax pattern was then shaped to the form of the tooth and the mold box rammed around this pattern, the pinion being set in a vertical position. A brick oven was built around the exposed, unwelded part of the pinion and a sheet iron sleeve was put over the neck of the pinion and filled with sand. This covered the pinion up entirely. A slow gas flame was then started in the brick oven and allowed to burn for 16 hours in order to heat the pinion very slowly. This was then increased to a hot blue flame and at the same time oil burners were applied to the molds to be poured. Two burners were used as

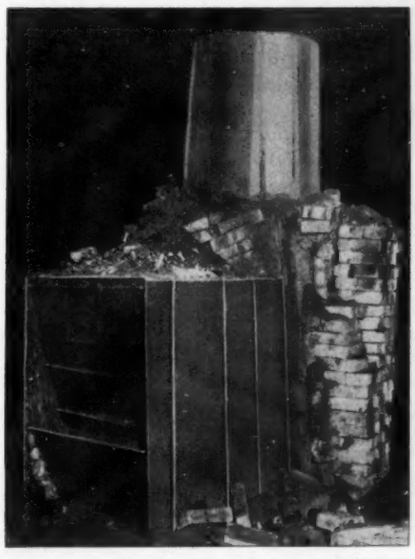


FIG. 1—OVEN BUILT AROUND PINION

FIG. 2—AT THE LEFT, NEW TOOTH WITH THE RISERS CUT OFF; AT THE RIGHT, NEW TOOTH SMOOTHED AND FINISHED

there were two teeth to be welded. The burners brought the sections to be welded to a blood red heat in about four hours. The thermit steel was then poured into the molds and the gas flame was kept going in the brick oven for six hours longer to hold up the heat in the body of the pinion until the weld had cooled to about the same temperature. The flame was then shut off and sand rammed between the oven walls and the pinion. The job was allowed to stand for seven days before opening the mold, so as to anneal the pinion thoroughly.

The work was handled by the steel company's own force with the advice and co-operation of the Goldschmidt Thermit Co., of New York.

Pennsylvania Produced Nearly 250,000,000 Tons of Coal in 1912

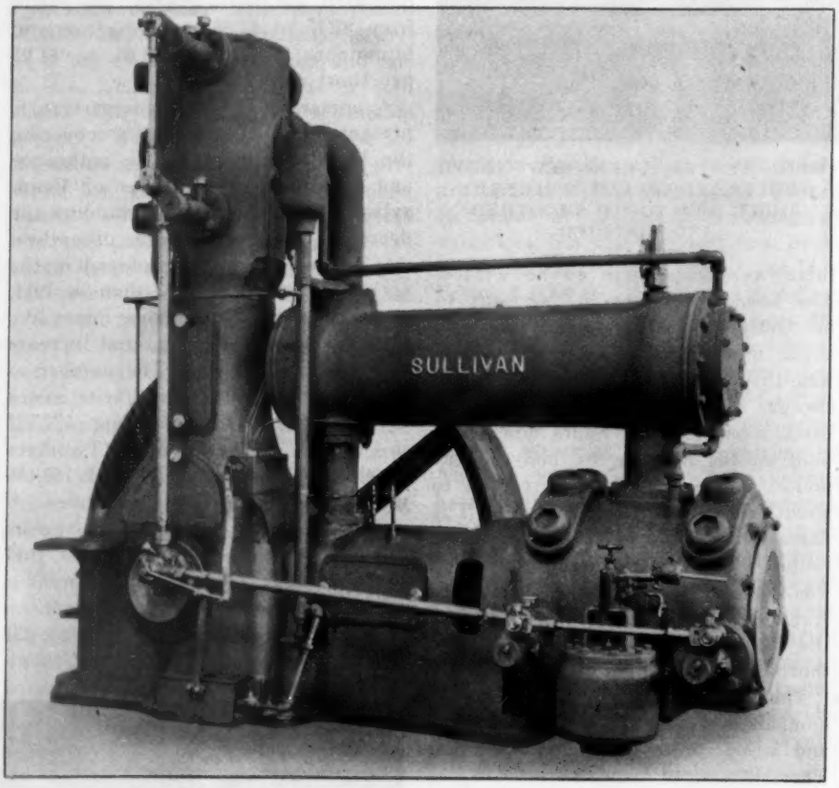
The combined production of anthracite and bituminous coal in Pennsylvania amounted in 1912 to 246,227,086 short tons, valued at $346,993,123, against 235,218,230 tons, valued at $321,537,250, in 1911, according to E. W. Parker, of the United States Geological Survey, who compiled the figures in cooperation with the State Topographic and Geologic Survey Commission. The increase in quantity was 11,008,856 short tons, or 4.7 per cent and the gain in value, $25,455,873, or 7.9 per cent. In 1911 the larger percentage of increase in value was due to an increase in the production of anthracite and a decrease in the output of the lower-priced soft coal. The total quantity of bituminous coal produced in the state in 1912 was 161,865,488 short tons, valued at $169,370,497, and that of anthracite coal 84,361,598 short tons, valued at $177,622,626. In 1912 both anthracite and bituminous values were increased in larger ratio than the increase in tonnage. On account of the suspension of operations on April 1 the production of anthracite in 1912 was less than in 1911 by 5,448,633 long tons in quantity and by $2,670,021 in value. The production of bituminous coal, on the other hand, increased 17,304,231 short tons in quantity and $23,215,545 in value. The average value per ton increased for both grades, anthracite from $2.17 to $2.36 per long ton and bituminous coal from $1.01 to $1.05 per short ton.

A somewhat unusual comparison is presented in the statistics covering the labor employed in the anthracite and bituminous coal mines of Pennsylvania in 1912. Notwithstanding the decrease in the production of anthracite, more men were employed in the anthracite mines in 1912 than in 1911, whereas in the bituminous mines the production showed a material increase with fewer employes. The number of men employed in the anthracite mines in 1912 was 174,063, against 172,585 in 1911. The bituminous workers numbered 165,144 in 1912 and 168,199 in 1911. The average number of working days in the anthracite region, however, decreased from 246 in 1911 to 231 in 1912, while in the bituminous mines the average working time increased from 233 days in 1911 to 252 days in 1912.

FIG. 3—WELDED TEETH WITH RISERS ATTACHED

Belt Driven Air Compressor

With the increasing use of molding machines, hoists over floors, chipping hammers, rammers and other pneumatic equipment, in foundries, the need of air compressors in this industry has grown rapidly in recent years. A new type of compressor, particularly adapted for foundry service, designed by the Sullivan Machinery Co., Chicago, is shown in the accompanying illustration. It is an angle compound, belt-driven machine, equipped with one high pressure and one low pressure cylinder, the latter being located in a horizontal and the former in a vertical plane. Both the low and high pressure pistons are driven by a single crank pin and all moving



SULLIVAN ANGLE COMPOUND, BELT-DRIVEN AIR COMPRESSOR

parts, except the valve gear, are provided with positive automatic lubrication enclosed entirely within the frames. The high pressure cylinder is supported in a vertical position above the crankshaft by a heavy frame or pedestal, having a broad base resting on the low pressure frame, to which it is secured by heavy bolts. The connecting rods are forged from open-hearth steel with marine type boxes on crank pin ends lined with babbitt metal. The crossheads are forged solid and are slotted for the reception of bronze boxes provided with wedge screw adjustment. The crankshaft is an open-hearth steel forging of the center crank type. Heavy cast iron counterweights are attached to each crank cheek so proportioned that they equal in balancing effect the entire weight of the reciprocating parts of either the high or low pressure side.

On machines of 12-inch stroke or over, the end of the crankshaft outside the flywheel is supported in an out-board bearing. On machines of less than 12-inch stroke, no outboard bearing is supplied. Both the low and high pressure cylinders have separate liners forced in the main castings, the spacing between the liners and cylinder castings forming the water jackets. The air cylinder heads are bored transversely for cylindrical rolling inlet valves and are provided with ample ports for the admission of air. The air inlet valves are of the Corliss type and the inlet ports are of ample area to fill the cylinder at atmospheric pressure when the compressor operates at maximum speed. The air inlet valves are driven by steel valve stems having T-heads on their inner ends. The air discharge valves are of the poppet type, internally guided on cast iron plugs, and are held to their seats by light steel springs.

The intercooler for removing the heat of compression in the air from the low pressure cylinder, consists of a cylindrical cast iron shell containing a nest of aluminum tubes through which cooling water circulates, entering at one end, transversing one-half the tubes and returning through the remainder. The intercooler is located immediately over the low pressure cylinder and frame. The water circulation for the cylinders and intercooler have only one inlet and one outlet, entering at the bottom of the low pressure cylinder, then passing through the intercooler and high pressure cylinder, leaving the latter at the top. This arrangement provides a positive circulation with no danger of entrapping air in the water spaces. All cylinders are provided with tapped openings for the attachment of indicator connections. All air and water spaces in the cylinders and heads are provided with drain cocks which, when opened, will effectually drain every part so that there will be no danger of freezing when the machine is shut down in cold weather. The driving pulley is mounted at one side of the machine on an extension of the crankshaft. When desired, the compressor may be driven by an electric motor mounted directly on the crankshaft. In this case the regular belt pulley is replaced by a heavy, square-rimmed flywheel securely keyed to the shaft close to the compressor frame.

Among recent shipments of gas engines by the Bruce-Macbeth Engine Co., Cleveland, are the following: Two 300-horsepower producer gas engines for the Metropolitan building, Philadelphia; one 150-horsepower natural gas engine to the Wallaceburg Gas Co., Wallaceburg, Ont.; one 100-horsepower producer gas engine and producer to the borough of Tampa, Schuylkill county, Pa.; one 50-horsepower producer gas engine to the Northwestern Electric Equipment Co., Velva, N. D., to be used for lighting purposes; one 40-horsepower natural gas engine to the Manufacturers' Gas Co., McKinley Station, Elk county, Pa.; one 50-horsepower producer gas engine to the Northwestern Electric Equipment Co., La Moure, N. D.; one 40-horsepower artificial gas engine to H. Adler, Buffalo, and one 40-horsepower natural gas engine to the Louisiana Gas Co., Morgansport, La.

A portable electric tool for drilling small holes in metal and wood, which can be attached to an ordinary incandescent lighting socket with either alternating or direct current, now is being manufactured by the Independent Pneumatic Tool Co., Chicago. The drills are equipped with universal motors which can be operated on 110 or 220 volts, direct or single phase alternating current.

Use of Electric Power in Foundry Operations

Discussion of the Control of Motor-Driven Equipment in Casting Plants, With Side Lights on the Adaptability of Lifting Magnets

By H F Stratton

IF, IN different industries, one undertakes to dissect and pick out the various contributing reasons which, blended, make profitable the use of electric power, he finds certain of these basic reasons in each different case. It is true, that in any particular branch of manufacture, one of these contributing causes may become very important, or even predominant. For instance, in the business of rolling steel products, probably the most important element of performance with which electric power must be credited, is speed of production, whereas such features as power economy, betterment of illumination, and freedom of fire hazard —all very much worth while in certain industries, as in cotton mills — are relatively unimportant in the steel mill, and in themselves have done little to accelerate the use of the electric motor in this industry. It is probably true that if a correct analysis can be made of the arguments, *pro* and *con*, relating to the use of electric power in most businesses, it will be found that conclusions based on this analysis do not differ materially from actual existing practice. Immediately, however, it should be stated that sometimes, and unfortunately, artificial or negative reasons delay the normal growth of the use of electric power. Such a reason may be the poor financial condition of even a large industry, where the manager cannot see his way clear to install new machinery, even though its installation will, without doubt, yield a return upon the investment proportionately, many times, in excess of the return which he is securing upon his old equipment. Another such case, and one quite frequent, arises from the fact that a business may be old and steeped in tradition and conservatism.

The sequence of evolution of an industry is that repeated thought or action grows to habit, habit to inherited habit, and inherited habit to instinct. Such an industry, guided largely in its policies by instinct and tradition, unless goaded by some unusual and peculiar stimulus, will be constantly behind the normal use of modern and economical processes and devices. May it not be true that the foundry business, which is the oldest of the important commercial metallurgical arts, is suffering from too much tradition and conservatism? Is it not also true, and possibly as a related fact, that of all the basic, big, metal industries, the iron foundry has been, during the last 10 or 20 years, the most disintegrated and the least profitable?

Much misapprehension can, and does, exist concerning the precise reasons by which the electric motor has been of such conspicuous financial benefit in its diversified applications. By limiting this very pertinent question to the industries immediately concerned with the production and manufacture of iron and steel products, it can be assumed that the one overwhelmingly important contribution of electric power, has been to magnify production enormously without increasing manufacturing equipment, or labor charges, in anything like the same ratio. Even in the electrical profession itself, much vagueness frequently exists as to the relative merits of the different arguments in support of electric power. All too often we find both the sellers and the buyers of electrical equipment much concerned over the question of a few dollars of extra cost for power or machinery, and overlooking the enormously vital consideration of what effect this contemplated new

FIG. 1—POURING STEEL CASTINGS FROM A LARGE BOTTOM-POUR LADLE

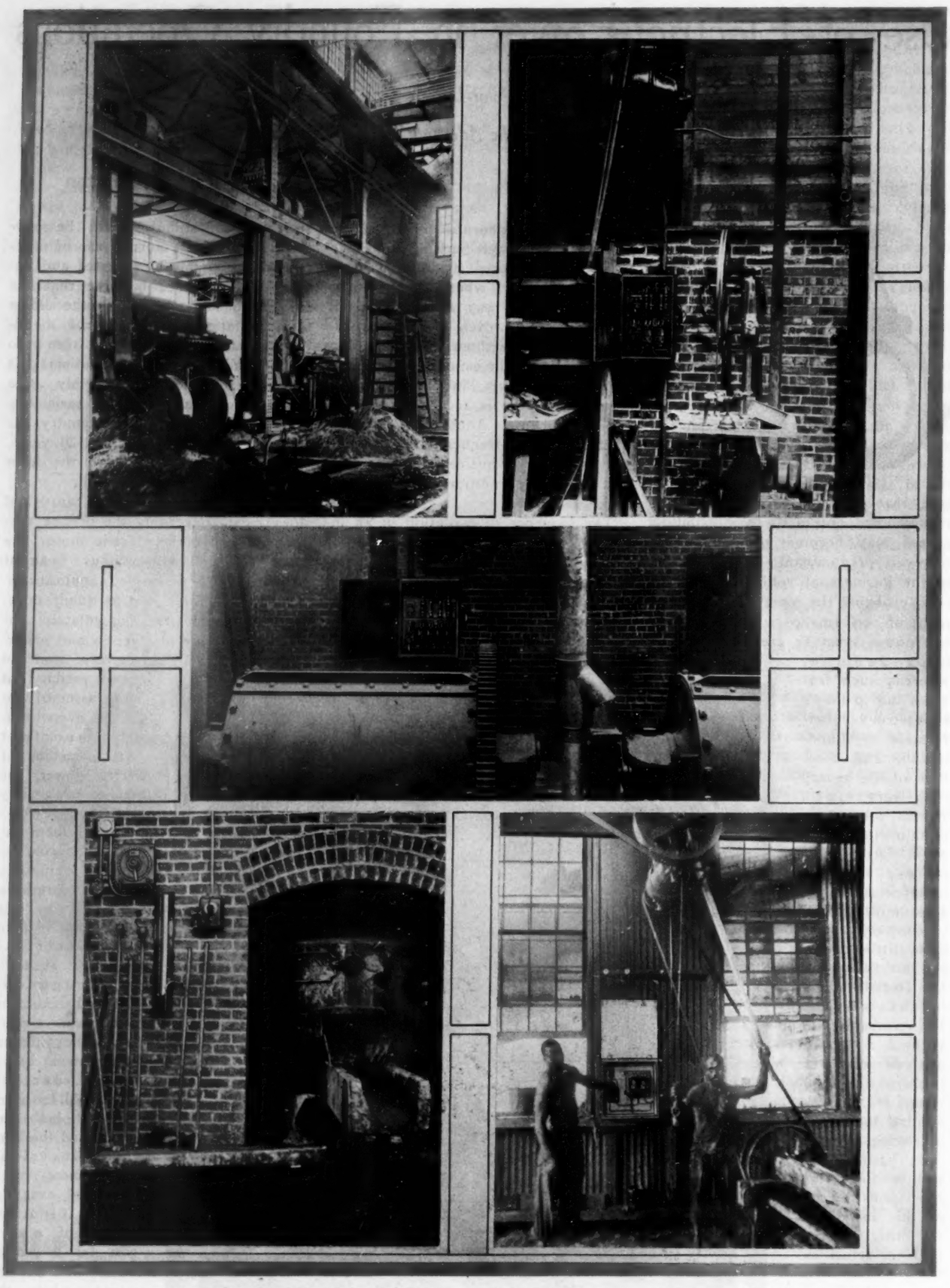


FIG. 2—SAND MILL MOTOR CONTROL

FIG. 3—AUTOMATIC STARTER FOR SPRUE CUTTER MOTOR

FIG. 4—MOTOR CONTROL FOR TUMBLING BARRELS

FIG. 5—PUSH BUTTON AND FIELD RHEOSTAT ON CUPOLA FOR CONTROLLING BLOWER MOTOR

FIG. 6—AUTOMATIC CONTROL OF MOTOR-DRIVEN, PIPE CORE MACHINE

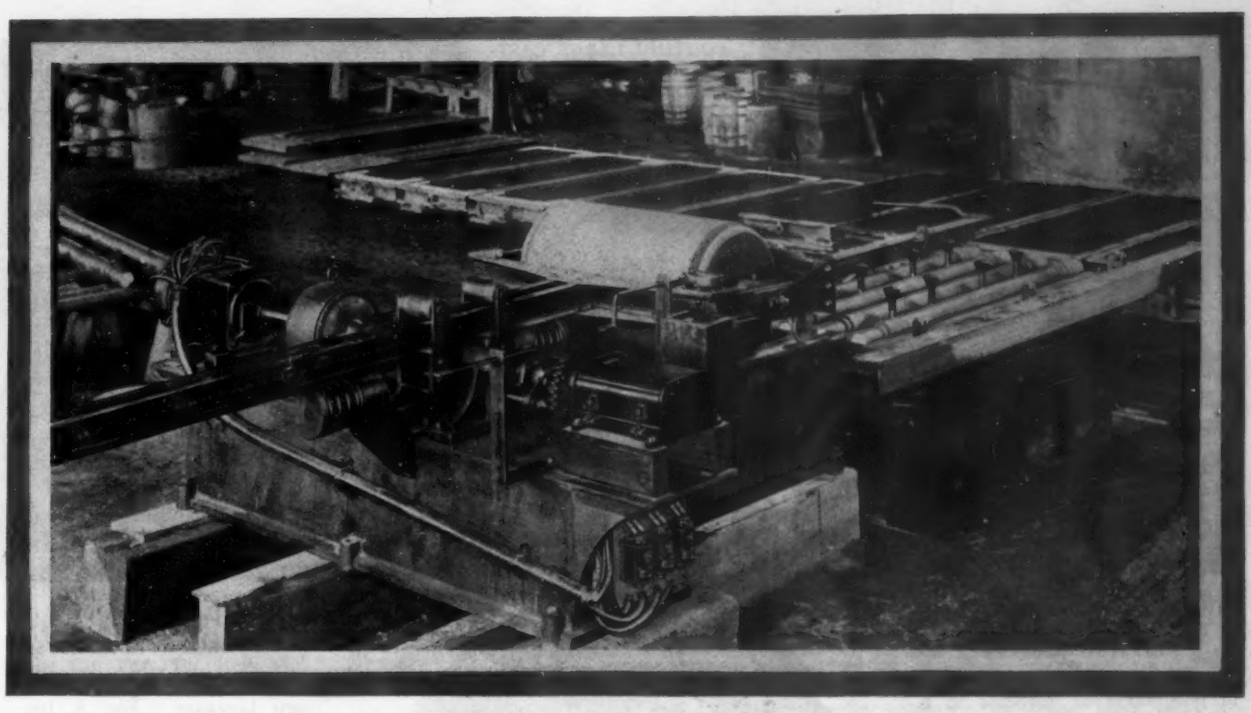


FIG. 7—OPERATOR'S SWITCH AND ACCELERATING UNIT FOR CONTROLLING OPERATIONS OF ROLLER-RAMMING MOLDING MACHINE

equipment will have on production and labor charges.

In the foundry, and in the allied metal trades, an electric motor merely supplying power, furnishes the least of the possible arguments for its use. It is not electric power that makes this subject so full of possibility and promise. It is rather *controlled* electric power. It is the ability to make the electric motor perform flexibly and automatically the various operations which are the bone and sinew of high speed production. It is the responsiveness and power of the controlled electric motor that enable a workman to do more work with less fatigue. It is the elimination of useless thought, worry and physical exertion that permits a workman to bend all his energy and ability to his real task, and as a quite natural result, to produce more work and better work; and it is the blending of these qualities of convenience, responsiveness, sense of adequate power and freedom from useless worry and work that is the real vital argument for the use of the electric motor.

Tons. per day.	Probable payroll No. of men.	per year ($2.75 per day.)	Tons per year.	Labor cost per ton.	Cost of electricity per ton.
5 to 10	40	$34,000	2,800	$12.15	$0.44
10 to 12	65	55,250	6,030	9.15	0.20
60 to 70	300	255,000	19,700	12.95	0.21
Average				$11.42	$0.28

The accompanying table was deduced from statistics published in the *Electrical Review* and *Western Electrician*, about a year ago, and relates to three different foundries, concerning each of which figures were tabulated for one year. Each of these foundries was pretty thoroughly equipped with the ordinary electric drive, and in each case the approximate number of men employed, and the approximate tons of metal cast per year, were known. It was assumed that the average wage of the men was $2.75 per day, and the cost of the electric power was 2 cents per kilowatt-hour. From these figures we secure the cost of labor per ton of metal cast, and the cost of power per ton of metal cast. This labor cost in the three different instances is $12.15, $9.15, and $12.95 per ton of castings. The cost of electric power, on the other hand, in the three cases, is 44 cents, 20 cents, and 21 cents per ton of castings. The average of these three cases gives a cost for electric power of 28 cents per ton of castings, and a cost for labor of $11.42 per ton of castings. In other words, if we take these figures as typical, in the motor-driven foundry, the cost of electric power is only 2½ per cent the cost of labor. The important deduction to be made is that any addition to the cost of electric power—even to the extent of doubling it—is relatively insignificant if, through its added convenience, only a small proportionate increase

FIG. 8—AUTOMATIC STARTER AND SPEED REGULATOR FOR GRINDERS

FIG. 10—MAGNET TRANSPORTING LARGE CASTING TO CLEANING FLOOR IMMEDIATELY AFTER SHAKING-OUT

FIG. 9—CASTINGS, GATES AND RISERS TRANSPORTED BY LIFTING MAGNET

FIG. 11—HANDLING HOT CASTINGS IN THE DUQUESNE STEEL FOUNDRY CO.'S PLANT

in production or decrease in labor cost is thereby secured. It is stated that during the last 50 or 60 years, the productive capacity of the industrial worker has increased in the ratio of 10 to 42, measured in dollars. During this interim the average laborer has certainly had his working hours shortened and the intensity of his effort diminished. What then can explain this enormous increase in productive capacity except the assistance which power-driven machinery has given to the workmen?

It is along just these lines of increased output and decreased cost, through the application of ingenious power-driven machinery, that the foundry industry has not grasped its full opportunity, and has not shown growth commensurate with that of very closely related businesses. These statements are, of course, general; there are instances where modern foundries have embraced a number of opportunities for installing the convenient modern devices which both accelerate and ameliorate the laborer's task A recent installation furnishing a number of examples of this type is the plant of the Canadian Locomotive Co., Ltd., Kingston, Ont., this undertaking having been in charge of the firm of Henry Goldmark, consulting engineer, New York City. In this plant the various motors are started and stopped by automatic controllers, so that the workman merely pushes one button to start the motor and pushes another button to stop it. The motor or the driven machine cannot be injured, and the operations of starting and stopping are so basicly simple that they can be readily understood and executed by a very low grade of labor, or by foreigners not familiar with the English language and capable of not much instruction except by sign language. Fig. 5, for instance, is an illustration of the front of a cupola, and it will be noted that there is a push button and a field rheostat mounted for convenient operation by the man standing on the tapper's platform. The push button and the field rheostat are respectively for starting and stopping, and for regulating the speed of the motor which drives the blower for the cupola. This motor is an adjustable, direct current machine, the speed of which is regulated by field control. This is, in fact, somewhat of a departure from the more common method of regulating by insertion of armature resistance, but it is distinctly a step in the right direction for several reasons; first, on most cycles of operation it is more economical to install an adjustable speed, direct current motor with field control than it is to install a direct current motor with armature control, since in the last named case power is wasted all the time that the motor is running at speeds slower than the fastest; second, the operations of starting and stopping are distinct from the operation of speed regulation with the scheme here used, so that the selection of the right speed is not interfered with every time the motor is started and stopped; third, there is a stability of speed connected with the field control that is not present with armature control unless the load remains entirely constant. In this particular case it is evident that the man standing on the tapper's platform cannot only start and stop the fan.

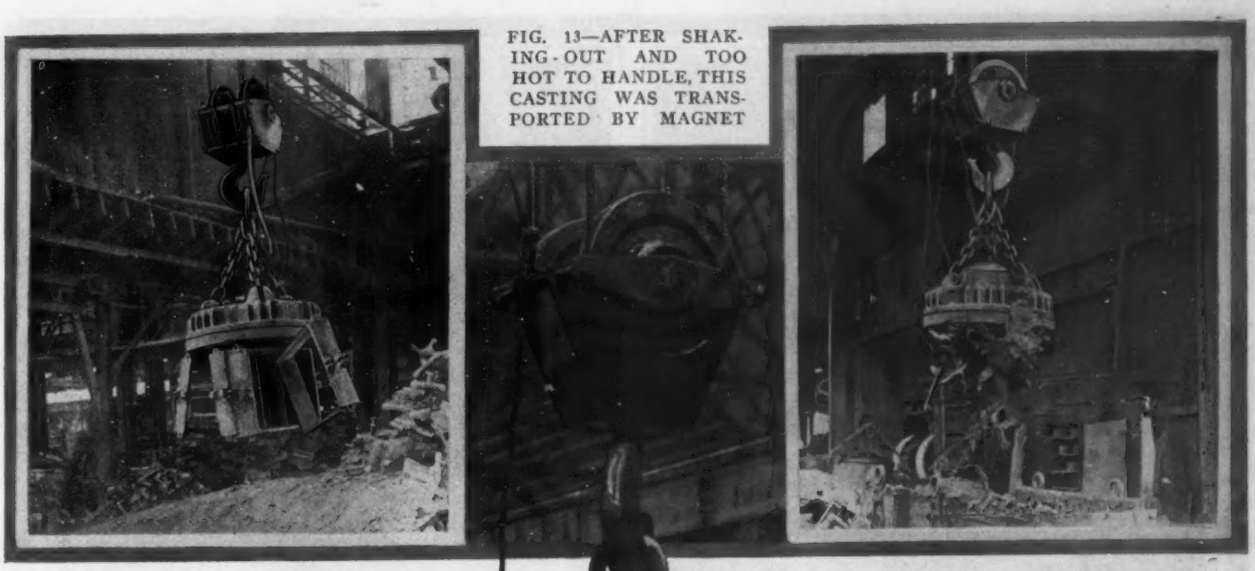


FIG. 13—AFTER SHAKING-OUT AND TOO HOT TO HANDLE, THIS CASTING WAS TRANSPORTED BY MAGNET

FIG. 12—LIFTING MAGNET HANDLING STEEL FLASKS

FIG. 14—LIFTING MAGNET LOADING CAR WITH GATES, RISERS AND SHOP SCRAP

but he can very definitely and easily regulate its speed and thereby regulate the speed of melting the iron.

Fig. 4, reproduced from a photograph made in the same plant, illustrates a portion of the cleaning room. A 20-horsepower motor drives two exhaust tumbling barrels and a fan dust exhauster. This motor is regulated by an automatic starter with remote control, so that for starting it is merely necessary to push one button, and for stopping to push another button. This operating unit, having its own motor drive, need not run idle and consume power during any period of time that the machinery is not in active use. It will be noted that this starter is enclosed in a sheet steel case to protect it from dust, which is a precaution and form of insurance well worth the trouble and cost in a foundry.

Fig. 3 shows the installation of an automatic starter for a motor driving a band saw sprue cutter in a brass foundry, this photograph also having been taken at the works of the Canadian Locomotive Co., Ltd.

Fig. 8 illustrates an automatic starter and a speed regulating field rheostat used in connection with a motor driving grinding wheels in the Duquesne Steel Foundry Co.'s plant, Coraopolis, Pa. In this case, starting and stopping of the motor are secured by merely closing and opening the knife switch, and the speed at which the machinery is driven is accurately and definitely determined by the setting of the field rheostat. Fig. 6 shows the application of automatic control to a motor-driven cast iron pipe coremaking machine in the American Cast Iron Pipe Co.'s plant, Birmingham, Ala. The remarkably developed negro in this view affords an illustration of a competitor for electric power that must be viewed with some concern. Speaking seriously, however, this picture really tells a story of how motor-driven machinery can be regulated safely and easily by the most ignorant labor where modern methods of automatic control are employed.

Fig. 2 shows an interesting use of motor drive and automatic starting and stopping applied to sand mills in the steel foundry of the Buckeye Steel Castings Co., Columbus. The only laborers permanently employed on these sand mills are used for shoveling sand, and certainly do not possess any knowledge of electrical machinery. An interesting installation has been made, mounting the automatic starters on the columns above the crane runway and locating the starting and stopping push buttons on the same columns near the floor. The shovelers at the sand mills find it easily within the range of their willingness and ability to start and stop these motors by merely pushing buttons, instead of possibly calling on an electrical man or foreman to perform these operations when needed.

Fig. 7 illustrates an application of motor drive and automatic control on a highly specialized machine which has been developed at the Snead & Co. Iron Works, Jersey City, N. J. This is a new type of the MacDonald roller-ramming molding machine for the manufacture of iron flasks used in soil pipe foundries, the operation of this machine having been described in detail in the July, 1913, issue of THE FOUNDRY. The interesting electrical features on this include what are called an operator's switch and an accelerating unit. By throwing the operator's switch by hand to one position, the motor starts, propelling the roller, and when the roller reaches its limit of travel, the operator's switch is automatically returned to the off position, converting the motor temporarily into a generator and stopping it quickly by dynamic braking. The motor then can be reversed by throwing the operator's switch to still another position, and after a certain length of travel the roller is

FIG. 15—LIFTING MAGNET LOADING CASTINGS TO BE CLEANED, ONTO FLAT CARS

FIG. 16—CLEANING-UP THE SHAKING-OUT FLOOR WITH A LIFTING MAGNET

again automatically stopped by dynamic braking at its initial position. All these operations are performed automatically without possibility of endangering the motor, and in absolutely the shortest safe amount of time.

In the technical papers and in manufacturers' bulletins, much has already been written about the use of the lifting magnet for unloading pig and scrap in foundry yards, and any one interested in this application of the magnet can easily secure definite information as to cost of installation, lifting capacities and economies effected, which are not merely theoretical, but which are backed by sufficient experience in numerous installations to convince the most skeptical.

Internal Use of Lifting Magnets

There is, however, another use of the lifting magnet in foundry work which has had little, if any, public discussion, and which is thoroughly in line with the policies and methods argued for in this paper. The application referred to is what might be termed the internal use of the magnet in the foundry. It is the use of a lifting magnet for handling flasks, copes and castings, picking up castings, grates and risers from the sand, and cleaning the sand of nails and other small pieces of iron or steel.

In a good many of the large, modern foundries, lifting magnets are used for an astonishing number of interior operations, and in such a capacity their effect is very important and contributes directly to the two results which have been previously mentioned as probably being the most profitable lines of endeavor along which the foundry manager can exercise his ingenuity. These two points briefly are, increasing production and decreasing labor charge without proportionally increasing equipment.

In a certain foundry where a magnet is largely used in interior work,

FIG. 17—STEEL COUPLERS REMOVED FROM SHAKING-OUT FLOOR BY LIFTING MAGNET

a description of its various operations will probably be of considerable interest. After the castings have been poured they are shaken-out by two men who first lift off the cast steel cope flasks. These are then stacked on edge, side by side, between the rows of molds. The crane then comes along with a magnet, picks up these cope flasks, generally getting four or five to a lift and sometimes more, and stacks them in a pile at one side of the molding floor.

The castings, which in this particular foundry, are not very large, are then dragged from the sand by means of a hook and are tipped into piles which include several castings. These piles are picked up with the magnet, carried to the end of the building and dumped at a point where the castings are rough-cleaned and the risers broken off. The drag flasks then are picked up by the magnet and handled the same way as the cope flasks.

Cleaning the Sand

For the next operation, the magnet is lowered to within a few inches of the sand and is slowly moved along horizontally, gathering up all the small pieces of iron which have been left in the sand. This use of the magnet is so effective in its cleaning that the sand is seldom screened to remove the iron, nails, etc.

The number of laborers required for cleaning up the floor has been conspicuously reduced, only about three men being required to clean up

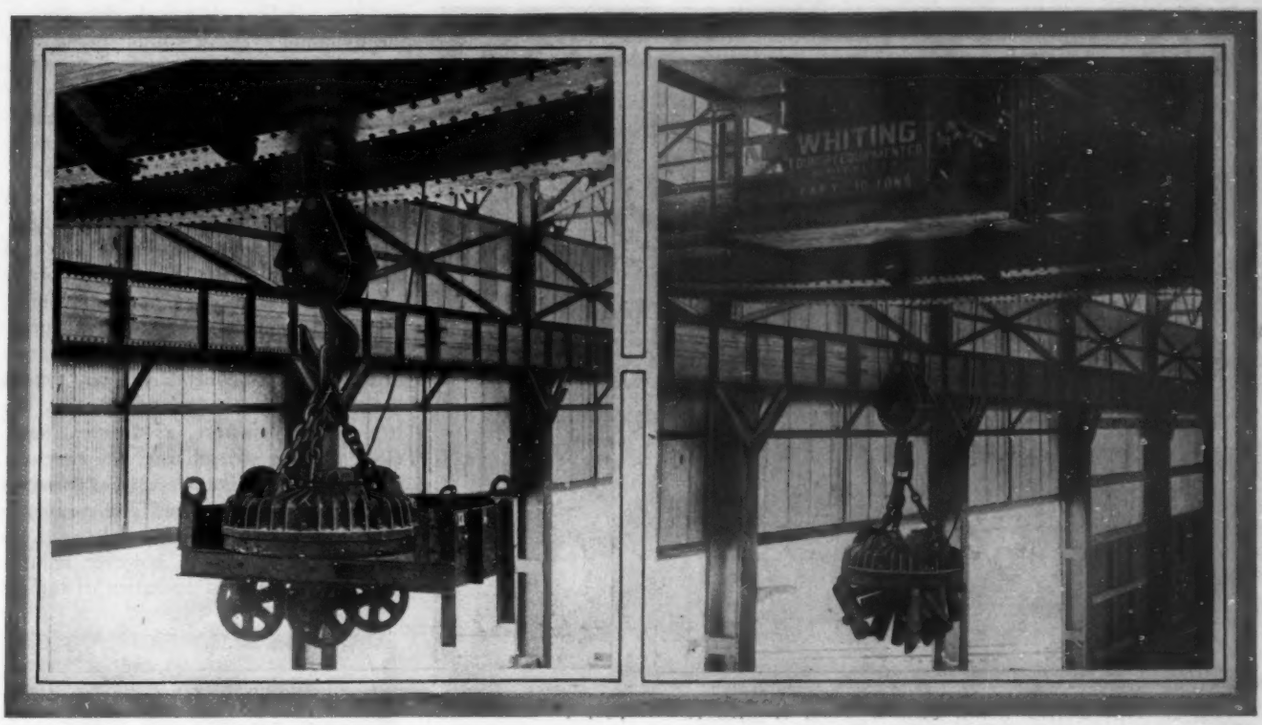


FIG. 18—LIFTING MAGNET TRANSPORTING CHARGING CAR

FIG. 19—LIFTING MAGNET CARRYING PIG IRON

the entire floor of this rather large foundry.

This magnet also is used for handling such equipment as steel boxes or buckets which are used for conveying sand from one point to another, as the crane operator can make better time handling these with the magnet than he could if he had to wait for a man to fasten the crane hook on the article to be moved.

Another interesting use of the magnet in this particular foundry is for filling the charging boxes for the open-hearth steel furnaces.

Economies Effected

The combined economies of the operations that have been cited are large. The number of laborers has been reduced and the speed of producing castings has been materially increased because instead of waiting for the castings to cool off they are handled while they are hot.

Fig. 12 shows a lifting magnet conveying cope and drag flasks from the molding floor after the molds have been dumped.

Fig. 18 illustrates the method in which the magnet is used for picking up and transporting charging cars at the plant of the Canadian Locomotive Co., Ltd.

Figs. 17 and 20 show an interesting phase of the work at the plant of the Buckeye Steel Casting Co., Columbus. Here the flasks are dumped, leaving the sand and the castings in a confused pile. While the castings are still much too hot to handle by hand, they are picked up with a magnet from the pile of sand and promptly conveyed to the cleaning room.

Figs. 10, 11, 13 and 16 illustrate different lifting magnets handling castings in the interiors of foundries. Fig. 11 shows the lifting magnet at work in the plant of the Duquesne Steel Foundry Co., and the other three were secured at the foundry of the Bethlehem Steel Co., South Bethlehem, Pa. In all of these cases the castings are picked up without waiting for them to cool much below a dull red heat, and it is of course obvious that by this procedure the production is materially speeded up.

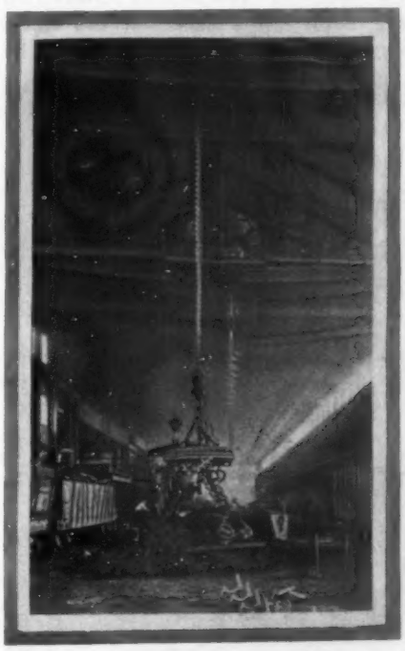


FIG. 20—LIFTING MAGNET TRANSPORTING HOT CASTINGS TO THE CLEANING ROOM

Fig. 15 illustrates a lifting magnet loading large castings onto a flat car preparatory to shipment to another department where they will be cleaned.

Figs. 9 and 14 show lifting magnets handling and loading gates, risers, etc.

Fig. 19 is an illustration of a lifting magnet handling a good load of pig iron. Of course, any foundry that possesses a lifting magnet should utilize it for the unloading of pig and scrap.

Electric Traveling Crane

There remains the electric traveling crane to discuss as an important illustration of power-driven machinery in the foundry. Rather conspicuous changes in the electrical equipment of modern cranes have occurred within the last two or three years. This statement applies more particularly to the cranes used in steel mills where the conditions are most exacting as to the severity of service and importance of uninterrupted operation. As a natural result, the most advanced crane practice finds application in steel mills, and we are justified in examining these new develop-

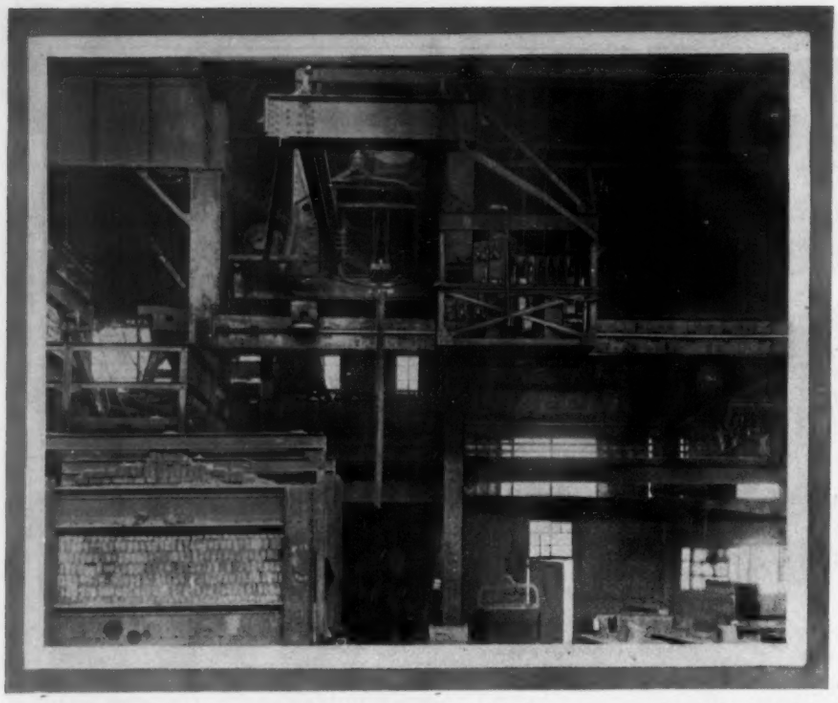


FIG. 21—TRAVELING WALL CRANE WITH MAGNETIC SWITCH CONTROLLER

ments as indicating the general trend of progress in crane design.

Some of these features of recent development have crept into the design of foundry cranes to only a small extent as yet, but as the reasons for their use in the foundry are basicly correct, it can be expected that the near future will witness their more prevalent adoption.

The three features of the electrical equipment of modern mill cranes, which have been the subject of the most important recent development, are: First, the use of the dynamic braking hoist controller without a mechanical brake in place of the old reversing controller with a mechanical brake; second, the use of magnetic switch controllers for motors on cranes which are worked very rapidly or on which the motors are of relatively large horsepower; and third, the installation of safety devices.

In regard to the first, without going into this matter in detail, it merely may be stated that a dynamic braking hoist controller elevates the load in the usual manner, but lowers the load by temporarily converting the motor into a generator and securing the required lowering speeds by making various electrical changes in the dynamic braking connections. The great argument for the use of dynamic braking controllers in the steel mills has been the fact that it eliminated entirely the use of the mechanical lowering brake, which, in such service, has proven to be unreliable and subject to heavy depreciation charges. In the steel foundry, where work is hard and rapid, the mechanical brake has been a source of prolific trouble, and, quite naturally, we find at present numerous installations of dynamic braking hoist controllers on cranes in various steel foundries. In the iron foundry, where, as a rule, conditions are not so exacting, the mechanical brake has not been the constant source of annoyance and expense that it has in the steel mill and the steel foundry. There is, however, another important feature of operation of the dynamic braking hoist controller, which makes it of decided interest not only to the steel foundry but also to the iron foundry. This feature is the excellent and stable speed regulation which is obtainable. By adding a shunted armature connection on the hoisting side and employing regular dynamic braking connections on the lowering side of the controller, extremely slow speeds can be obtained on the first points, hoisting and lowering. Not only are these speeds slow after they have been reached, but there is no appreciable shock or jar when the controller is moved to the first point, either hoisting or lowering, nor is there the necessity

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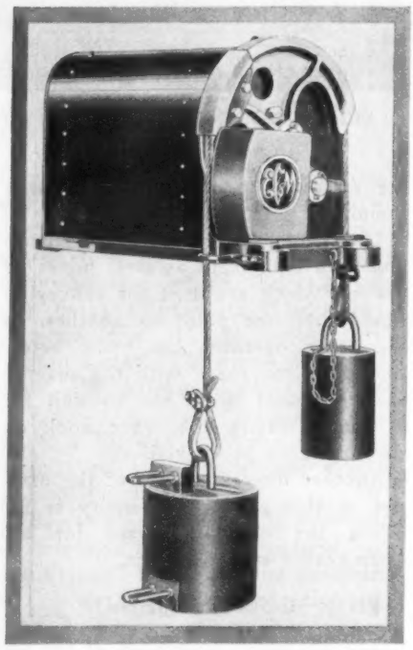


FIG. 23—SAFETY LIMIT STOP

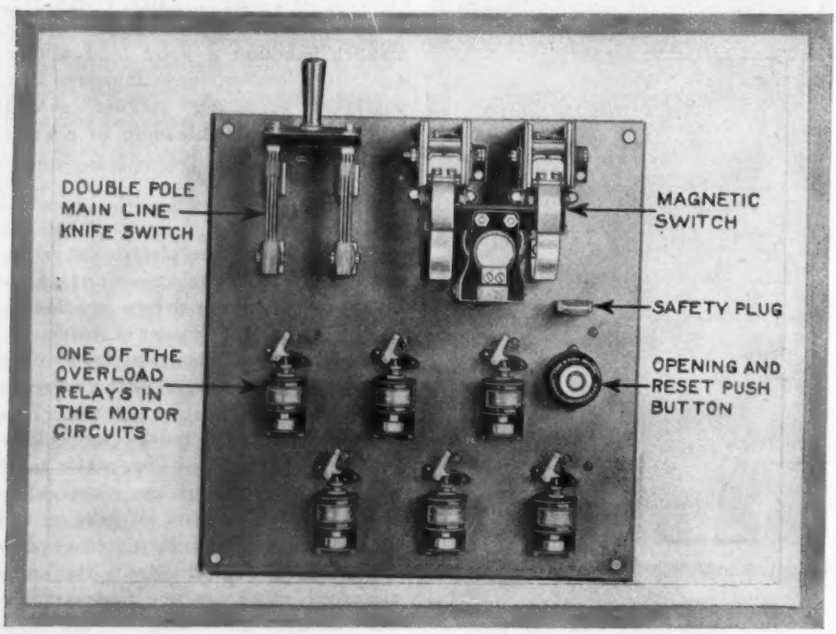

DOUBLE POLE MAIN LINE KNIFE SWITCH
MAGNETIC SWITCH
SAFETY PLUG
ONE OF THE OVERLOAD RELAYS IN THE MOTOR CIRCUITS
OPENING AND RESET PUSH BUTTON

FIG. 22—CRANE SWITCHBOARD, WITH EXPLANATIONS OF VARIOUS PARTS

IRON AND STEEL MARKETS

Large Pig Iron Tonnages for Cast Pipe Pending

And Sellers Resist Efforts to Place Orders at Very Low Prices—
Users of Finished Materials Buying for Immediate Requirements Only

BY GEORGE SMART

Steadily diminishing demand for iron and steel products has resulted in still further curtailment of production and many employers are compelled to reduce their working forces, but are planning to keep as many as possible employed throughout the winter and not to reduce wages unless conditions become very much worse than they are at present. All evidence points to the fact that stocks are low and that nothing is being done to replenish them. Hence it seems certain that when general conditions improve, there will be a very active demand for prompt delivery of all kinds of materials. Some pig iron sellers are showing considerable nerve in resisting the attempt of cast iron pipe makers to place orders for pig iron at low figures. Careful investigation shows that there is very little opportunity at present for foreign makers of iron and steel products to sell in this country any considerable tonnage. Depression continues in England and Germany.

Pig Iron

The United States Cast Iron Pipe & Foundry Co. is actively negotiating for pig iron up to 30,000 tons for different plants, and it is expected to take 50,000 tons. The report that the pipe company purchased 20,000 tons from the Tennessee company is officially denied by the latter, and doubt is expressed as to whether the iron was purchased from other companies. The southern situation seems to be slightly weaker and prices in southern Ohio are irregular. There is some unsteadiness in other parts of the country on account of the extremely light demand, but for the most part, quotations are pretty well maintained and many furnaces will undoubtedly blow out rather than sell at lower prices.

Iron and Steel Bars

Agricultural implement makers in the central west are specifying very slowly, presumably with the hope of having prices on contracts reduced. The ordinary quotation on steel bars is 1.30c, Pittsburgh. Bar iron is weak, especially in Chicago and some eastern centers, and mills are running intermittently.

Railroad Buying

Car orders of the week amounted to 1,500, including 500 hoppers for the Lehigh & New England, ordered from the Pressed Steel Car Co. The Louisville & Nashville has placed an order for 1,100 underframes. Railroads are showing more interest and hope is still entertained that general buying will not be long delayed. Contracts for the sub-structure for a bridge to be erected by the Rock Island and other roads across the Mississippi river at Memphis having been let, it is expected that bids will soon be asked on the steel work, which will call for about 30,000 tons. Rail business is still disappointing.

Iron Ore

The terrible storm of last week, resulting in the loss of 19 vessels and nearly 300 lives, has almost brought the lake season to a close. Many vessels are already in port, including all of the Pittsburgh Steamship Co. To what extent new vessels will be built to take the place of those which have been lost will probably depend upon business conditions. The bills for repairs of damaged boats will be heavy. Blast furnaces which were compelled to bank on account of the storm resumed after a few days' idleness. Many other manufacturing plants were seriously inconvenienced for a week.

Sheets and Plates

Shading continues on sheets and plates. Although 1.30c, Pittsburgh, is frequently obtained on plates, a quotation of 1.26c, eastern Pennsylvania mill, which figures under 1.20c, Pittsburgh base, is reported to have been made on a lot of 1,100 tons, mostly plates for Baltimore shipment. This business went to a Pittsburgh mill. The sheet market is irregular and as low as 1.90c has been made on No. 28 black, while 3c on galvanized No. 28 has also been shaded, but prices are now steadier and 1.95c is apparently minimum on black.

Scrap

Following the recent declines in the price of old material, several hundred tons of car wheels have been sold for export to Belgium and opportunities are presented for exports of heavy steel and other grades of old material to several European countries. This export movement may check the decline in scrap in the eastern territory, where one steel maker obtained several thousand tons of heavy melting steel at $10.25, delivered.

Coke

The making of a contract for 12,000 tons per month of furnace coke for delivery within the first six months of next year at $2.15, ovens, shows that the market is somewhat stronger than generally considered. On spot furnace coke, however, as low as $1.75, ovens, has been made. Shortage of coke at lake furnaces, due to the storm last week, continued for only a few days.

Decreased Operations at Pittsburgh

No Severe Cuts in Prices, But Quotations Are Low and Irregular—Mills Continue to Dismiss Men—No Wage Reductions

BY C. F. WILLIAMS

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg.,
Pittsburgh, Nov. 18.

Buying of iron and steel products continues to decrease, and production gradually is being curtailed. Mills, including those of the United States Steel Corporation, are operating at between 50 and 80 per cent of capacity, while buying, it is conservatively estimated, is not more than 50 per cent of capacity, clearly indicating that present conditions cannot continue for any length of time. The market is far from being demoralized, however. There have been no severe cuts in prices and there will be none in the immediate future, according to present indications. During the past week, sheets have displayed further weakness, especially outside the Pittsburgh district; pig iron has been decidedly quiet, and prices have not been tested; plates, shapes and bars show no change in position; coke has continued quiet, but is very plentiful; old material is marking time at comparatively low price levels. There is no change in the labor situation; mills continue to let men out, but wages have not been reduced, and it is not probable reductions will occur unless general conditions become much worse.

Pig Iron.—This has been a decidedly quiet week in the local pig iron market. No sales of importance have been made, and prevailing quotations, which are comparatively low, are practically nominal. Foundry, malleable and gray forge irons, especially, are represented by nominal prices. Additional blast furnaces in this district contemplate blowing out before the end of the month.

Ferro-Alloys.—The market continues quiet in this district, and prices have not been tested recently. Dealers report practically no demand for either ferro-manganese or ferro-silicon.

Plates and Shapes.—Demand is exceedingly light, and prices not any too strong. Expressions are heard that an attractive tonnage of shapes could be obtained at 1.25c, but no large orders have been placed this week. On small lots, mills are receiving 1.30c and 1.35c for shapes, but plates are selling at about $1 a ton under those figures. New business is being actively solicited, and quick deliveries are possible.

Sheets. — Price irregularity again features the market. Black sheets have sold at 1.95c and as low as 1.90c is reported for No. 28 gage, and galvanized products have declined about $1 a ton. Automobile builders, usually prominent factors in the market, have not been buying so heavily as a few weeks ago. Blue annealed sheets have sold at 1.45c, in some districts, but the general market appears to be 1.50c for No. 10 gage. Independent mills are reducing outputs. Serviceable mills of the American Sheet & Tin Plate Co. are operating at about the rate of speed prevailing last week.

Rails and Track Material. — Rail manufacturers continue to receive orders for future shipment, and plants will be busily engaged the remainder of the year filling orders already specified against. Spikes are being held at 1.60c, but the price has not been tested recently. Other track fastenings are nominal.

Billets and Sheet Bars.—An inquiry for 10,000 tons of sheet bars for shipment the next three months is before the trade, and unless the tonnage is obtained through an exchange, the culmination of this transaction will show the status of the market. Billets are obtainable at $21 and sheet bars at $22, maker's mill, either Pittsburgh or Youngstown, it being apparent that mills at both centers will sell at those figures.

Hoops and Bands.—Specifications are falling off, and prices of hoops are uncertain. Mills are selling small lots at 1.50c, but an inquiry for an attractive tonnage undoubtedly would bring out a lower figure. Bands are quotable at a range from 1.30c to 1.35c.

Iron and Steel Bars.—The market for both iron and steel bars is quiet. Iron bars are being held at 1.50c by some makers, but sales are being made at less than that figure, and it would be possible to bring in material from other centers at less than the general asking price here. Steel bars are being held at 1.30c, with some tonnage going at 1.35c, but prices have not been tested. Shafting is listed at 62 and 63 per cent off list for carloads.

Muck Bar.—The Youngstown Sheet & Tube Co. and the A. M. Byers Co. are operating puddling mills in part, after refusing to sign the scale asked by the United Sons of Vulcan. Muck bar nominally is quoted at $30, Pittsburgh.

Bolts, Nuts and Rivets.—Business has been decreasing the last 10 days, and mills are in a position to offer rather quick shipment. Discounts on nuts and bolts are being held on small lots, but concessions are being obtained by buyers of large tonnages.

Tubular Goods.—Discounts are being fairly well held. Demand for oil country goods continues heavy, but no large orders have been placed this week. Boiler tube discounts continue irregular, but no new prices have come out.

Tin Plate.—Mills are selling large tonnage for next year's shipment, but the market is not so brisk as it was a fortnight after the season's price was announced a year ago. Mills are maintaining the prevailing price, and no irregularity is reported.

Wire.—Reports of price concessions again are heard, but $1.60 continues to be the general quotation for nails. Mills are being asked for lower prices, however, and present conditions cannot continue indefinitely. The end of the season is in sight. Some of the mills are not operating at more than 50 per cent capacity.

Wire Rods.—The market, which is quiet, is quotable at a range from $26 to $27, Pittsburgh.

Coke.—A number of negotiations for contract furnace coke have been opened, but dealers have refused to announce prices. Spot blast furnace fuel is selling at about $1.85, ovens. Foundry coke is quiet, but unchanged in price. The Connellsville Courier, for the week ending Nov. 8, says production was 354,045 tons, a decrease of about 20,000 tons compared with the week before. Shipments are falling off rapidly.

Old Material.—Mills still have rather heavy stocks on hand and have not had to figure in the open market. A sale of heavy melting steel at $12, to an outside consumer, is reported, but the general market is quotable at a range from $11.50 to $11.75. Other grades are quiet, and unchanged in position.

According to figures compiled by the public service commission of Pennsylvania, there are 4,355 steel passenger cars in service on the 82 railroads operating in that state. There are 11,889 passenger cars in service, of which 7,163 are all wood, 1,271 wood with steel underframes, and the rest all steel. In the list are 1,365 Pullmans, of which 1,018 are all steel, 62 wood with steel underframes, and the rest wood. The report is the first of its kind compiled.

Chicago Buyers Are Still Indifferent

And Business is Reduced to a Very Small Volume —Railroad Buying at Low Ebb—Prices Declining

BY H. COLE ESTEP

Office of THE IRON TRADE REVIEW,
1521-23 Lytton Bldg.,
Chicago, Oct. 18.

Only in periods of the greatest financial depression has new business heretofore been reduced to its present proportions. The curtailment is due largely to an utter indifference on the part of the buyers in their future requirements; this statement is as true of the general consumer as it is of the railroads. Encouragement is found in the large volume of hand-to-mouth business which is sufficient to prevent a sharp break in prices. Quotations, however, are gradually slipping to lower levels and plant activities are growing less from day to day. Most of the mills in this territory now have about six weeks' rolling ahead, with the plants operating at a little over half their normal capacity. Buyers, of course, can obtain practically any delivery which they desire, and this condition is having its usual effect on store business. The top price on bars and shapes is 1.30c, Pittsburgh, with plates $1 a ton lower. These quotations, however, are more or less nominal on account of a lack of sufficient activity thoroughly to test the market. Specifications and new orders for steel bars are particularly scarce; structural lettings have shown a marked falling off this month. Car buying is at a low ebb and very little rail business is expected during this year. In the lighter finished lines, there is a fair demand for sheets and wrought pipe and a slowing down in orders for wire products. Scrap prices have reached new low levels.

Pig Iron.—Consumers persist in their indifferent attitude toward their 1914 requirements, although the rather significant volume of spot business indicates that the foundry yards are generally bare of iron. The price of local foundry grades is soft, but has not yet gone under $15, Chicago furnace. Decreasing consumption has altered the situation in the south with the result that $11, Birmingham, is the top price in Chicago for first half shipment. Some iron is being offered at lower figures. The International Harvester Co. recently specified for 5,000 tons on a contract which it has with the leading interest. The Hart-Parr Co., Charles City, Ia., is in the market for a moderate tonnage of foundry iron. There are scattering inquiries in Chicago and vicinity for southern foundry grades.

Merchant Bars.—The past week has been characterized by a marked contraction in both specifications and new business. The implement interests are holding up their orders for bars in the hope of obtaining a readjustment of their contracts and it is not expected that there will be much revival of activity from this source until after the first of the year. With possibly one exception, the mills in this territory are operating at about half their normal capacity. There is so little business that it is very difficult to determine a definite market price. The ruling quotation appears to be 1.48c, Chicago, but a considerable fraction of the little tonnage now coming out is undoubtedly going at lower figures. There is no life to the iron bar situation and prices remain uncertain. Shafting is weak and irregular. Warehouse business is light and the recent price reductions have had no effect on the volume of business.

Plates and Structurals.—Aside from a sprinkling of orders for tank and car plates, the market is devoid of activity. Prices are weak at 1.25c, Pittsburgh. Most of the mills in this territory have about 60 days' work ahead at a reduced rate of operation. Buyers everywhere are practically devoid of stocks and the time of delivery is often an important factor in placing an order. Boiler shops are operating on a reduced basis and the demand for high grade heavy boiler plate is quiet.

Rails and Track Fastenings.—Further developments in standard rail buying are not now looked for until next year. The western roads are apparently waiting for the Pennsylvania and New York Central lines to take the lead and until these orders are placed, it is not expected that there will be much activity in this territory. Orders for track fastenings and light rails are at a minimum.

Bolts, Nuts and Rivets.—There have been no developments of an encouraging nature in the bolt, nut and rivet situation. One of the leading producers is operating its plant at about 60 per cent capacity on a hand-to-mouth basis. The railroads are practically out of the market and are not tempted by low quotations.

Sheets.—Some mills in central Ohio are entering the western market aggressively with quotations as low as 2.90c, Pittsburgh, for No. 28 galvanized. This is equivalent to 3.08c, Chicago. The local makers apparently so far have not reduced their figures under 3.10c, Chicago. Black sheets, No. 28, are $20 a ton lower than galvanized. A prominent mail order house of Chicago recently bought 150 tons of roofing sheets on a basis of 3.13c, Chicago, for No. 28 galvanized. The local mills are operating at 85 per cent capacity. Some buyers seem anxious to contract for the first half of the year, but their efforts are not encouraged by the manufacturers.

Wire Products.—Nails and barb wire are weak at 1.78c, Chicago. Business is light and although a large number of orders are coming in, their aggregate tonnage is discouraging. Although efforts are being made to hold the market in line, it is not unlikely that the tender of any volume of business would bring out lower prices

Cast Iron Pipe.—A continuation of inactivity coupled with softening of prices characterizes the cast iron pipe situation at present. The season for municipal lettings is practically at an end; buying from gas companies is very limited and railroad business is practically non-existent. The leading interest has taken 200 tons at Frankfort, O.

Merchant Pipe and Tubes.—With boiler shops curtailing their activities, the market for tubes is becoming narrower with a consequent tendency to shade prices. The volume of warehouse business in the common sizes of iron and steel pipe remains about the same.

Old Material.—Recent developments have compelled another general reduction in our quotations on scrap, ranging from 25c to 50c per ton. There is no resistance to the decline and no one seems to be prepared to state where it will end. Some grades are getting so low that the freight charges represent a very large proportion of their cost to the consumer. A considerable tonnage of steel axles changed hands last week at $12.75, Chicago, and this figure could probably now be shaded 25 cents a ton by an aggressive buyer. Railroad offerings recently have been comparatively light. The St. Louis & San Francisco sold 590 tons on Nov. 17, including 100 tons of No. 1 wrought, 80 tons of railroad malleable and 50 tons of No. 1 busheling.

Storm Practically Closes Ore Shipping

Many Vessels Already in Port for the Winter—Blast Furnaces and Other Plants Resume—Market Very Quiet

BY GEORGE SMART

Office of THE IRON TRADE REVIEW,
Penton Bldg.,
Cleveland, Nov. 25.

Iron Ore.—The great storm which raged on the great lakes a week ago Sunday, destroying several modern steamers, so demoralized the lake ore trade that it is practically at an end for the season. Every vessel belonging to the Pittsburgh Steamship Co.'s fleet is in winter quarters. The Cleveland-Cliffs Iron Co. will ship its last cargo this week and all other shippers expect to be through by the end of the week. The November movement will therefore be lighter than was expected, as little ore was moved during the past week. This is the earliest closing that the ore trade has experienced in many years. The total movement of ore by lake will not be greatly in excess of that of last year, though it is expected that the 48,000,000-ton mark will be reached.

Pig Iron.—Furnaces in the Cleveland district which were banked on account of last week's storm resumed after being idle from two to five days. Deliveries are going forward as usual and the melt continues heavy, but there is almost no buying for either prompt or forward delivery.

Coke.—Shipments of coke were resumed after a few days' delay, due to the storm, and railroads were able to meet the demands of furnaces and foundries. The market for both furnace and foundry coke is dull, with no changes in prices.

Finished Material.—Many Cleveland plans were seriously inconvenienced for a week on account of the storm, and are just now catching up on deliveries. With some, the period of inactivity in production was not unwelcome, as they have not enough orders on hand to keep them busy. This applies particularly to the bar iron plants, as the demand for iron is very limited and prices are low. Owing to the great damage done to wires of railroads, telephone, electric light and telegraph companies, there is temporarily an active demand for wire. Except for this increase in demand, however, the wire market has been quiet, but prices are fairly well maintained. The only finished line showing continuous activity is light rails. Coal companies are still buying freely, but there is considerable cutting of prices, owing to the competition of rerolling mills. The structural market is flat and there is very little activity in plates, on which low quotations are being made. Irregularities continue in sheets, and below 2c, Pittsburgh, has been quoted on No. 28 black.

Old Materials.—No decline in prices is noted in the scrap market this week; traders, however, find rather sorry comfort in this, since prices are already down around the lowest level in many years. Transactions have been few and far between; most mills are altogether out of the market. One rolling mill is reported to have offered $8 for busheling, but no sales have been made at this figure. We continue to quote $8.50 to $8.75 for heavy steel; the leading buyer in the market here offers $9.50, but is said to have obtained only limited tonnages.

URGENT DEMAND

For Delivery of Pig Iron, But New Buying is Very Light in South.

BY W. B. NEAL

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., Nov. 18.

Pig Iron.—The inquiries for pig iron have not been so numerous for the past week, yet the demand for delivery of iron upon previous contract is most urgent, and in some instances the purchasers are on the ground to try to effect delivery. The furnace interests have sold far in excess of their make, except as to one furnace, and its weekly bookings are equal to its make. The furnace yards have but little iron, and such as is in stock is of the lowest grades. Sales for the week aggregate 4,500 tons, 3,500 tons of which was sold by one furnace in lots of 250 tons and 500 tons for first quarter delivery, 1914, and was entered at $11.50 per ton, No. 2 foundry, basis Birmingham. And 1,000 tons was entered in carload lots and 100-ton lots for prompt delivery at regular quotations.

The reported sale of 20,000 tons of southern pig iron on a basis of $10, Birmingham, to United States Cast Iron Pipe & Foundry Co. fails of confirmation at the several sale departments of the furnace company, and it is thought that, if such a sale has been made, there is error in its announcement somewhere, either as to grade or price.

Cast Iron Pipe.—Plants continue to operate, but have reduced their output to a considerable extent. No new orders of any very large volume have been entered, but it is understood that a large tonnage for Panama is now pending and will soon be awarded. The shipment of pipe continues and while business is said to be below normal, fair business is evident from the forwardings to be seen each day. A fairly large tonnage went forward to Panama this past week.

Old Material.—The market continues very inactive in this line and only such tonnage as was entered on contracts sometime previous, is moving, except heavy machinery scrap, which is in fine demand and moves as fast as it is available. The dealers are taking only such tonnage as is offered at bargain prices and their stocks are increasing materially. The tonnage delivered to consumers for the week amounted to some 125.

"Back With the Saloon"

Thomas D. West, chairman of the committee appointed by the American Foundrymen's Association to consider the advisability of adopting plans for getting rid of saloons in the neighborhood of industries, has received the following from C. O. Bartlett, president of the C. O. Bartlett & Snow Co., Cleveland:

"The writer wishes to thank you very much for your stand taken against the saloon, given in the issue of the 14th of THE IRON TRADE REVIEW, entitled 'Back With the Saloon'. This is a very important question for the manufacturers to consider, by far *the* most important one, in the judgment of the writer."

The Brown & Sharpe Mfg. Co., Providence, R. I., has just completed a new addition to its No. 5 building. The addition is two stories and contains about 13,000 square feet of floor space, but it is planned to add several more stories to it later. The new building for the present will be used for storage purposes.

The Bowler Foundry Co., Cleveland, advises its addition is to enlarge the crane runway and a portion of the present building is being torn down. The contract for the improvement has been let.

Active Inquiry for Pipe Making Iron

And Leading Company Figuring on Large Tonnage —Exporting Scrap to Europe—Low Prices on Plates

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
326 Real Estate Trust Bldg.,
Philadelphia, Nov. 18.

A dragging market still characterizes the situation with eastern iron and steel makers. With the mills, the problem of how to keep their men employed during the winter months is looming up more ominously. Prices continue to weaken. In the pig iron market, the negotiations for round tonnages by cast iron pipe makers, including the largest producers, are attracting much attention. An important development in the scrap market in this district is the beginning of exportation to Europe of some grades because of the unusually low level of domestic prices.

Pig Iron.—Among the cast iron pipe makers at least, there seems to be a disposition to cover ahead more freely and a round tonnage for these consumers is now pending. In addition to a reported large purchase of southern iron in the Cincinnati territory, the United States Cast Iron Pipe & Foundry Co. is now actively negotiating for forward iron for its various plants in different sections of the country. This consumer is estimated conservatively to be figuring on 25,000 to 30,000 tons at present, and is expected to buy considerably more. Reports in connection with these negotiations indicate a weaker southern market of at least $10.50 for No. 2 and lower is rumored. A Lynchburg, Va., pipe maker asks 6,000 tons of Nos. 3 and 4 and forge for first quarter. Another pipe maker in this district continues to figure on 6,000 tons of low grade iron for January-February delivery. Northern foundry iron is moving slowly, with prices ruling about $15.50 to $15.75, this district, for No. 2X. Leading Virginia makers hold to $13, furnace, for No. 2X, but on an attractive lot this could probably be shaded. Some selling of northern standard forge in lots of 500 tons or less at $14.75, delivered, is being done. One eastern Pennsylvania consumer closed for about 1,000 tons in the week. An inquiry for 500 tons is out. Basic iron shows no demand and its strength around $15, delivered, is uncertain. Aggregate sales of about 4,000 tons of standard low phosphorus iron of 0.03 phosphorus quality are reported this week on the basis of $22 to $22.25, Philadelphia. Iron of 0.035 analysis is quotable at a lower figure. Several thousand tons for the American Steel & Wire Co., for Worcester, Mass., delivery, is included in the sales reported. A tentative inquiry for 1,000 tons of low phosphorus iron is out in this district. Small sales of Lebanon iron at unchanged prices are noted. The Keystone furnace at Reading of the Reading Iron Co. is expected to resume soon.

Iron and Steel Bars.—The lowest price being offered by makers of steel bars in this district appears to be 1.30c, Pittsburgh, or 1.45c, Philadelphia, and some small sales are going $1 higher. There is little new business moving. A Baltimore buyer took 300 tons. Bar iron continues quite soft and it is reported that 1.20c, mill, or 1.27½c, Philadelphia, is available on common bars. Some mills ask $1 to $2 higher. Business is slow.

Plates.—Further shading of prices still is to be noted on the attractive tonnages, though 1.30c, Pittsburgh, is the usual price of eastern makers. In some cases, this shading takes the form of an absorption of the Pittsburgh freight by eastern makers for delivery in this and adjoining districts. A quotation of 1.26c, eastern Pennsylvania mill, or 1.33c, delivered, is reported to have been made on a lot of 1,100 tons, mostly plates for Baltimore shipment. This price figures under 1.20c, Pittsburgh base. The business went to a Pittsburgh mill, which made the lowest average price on the plates, shapes and bars included in the inquiry. The Baltimore & Ohio railroad is inquiring for 2,100 tons of shop material, including 1,000 tons of plates. A report that the Clyde Steamship Co. had awarded a large vessel to an eastern yard, is incorrect. These boats still are pending. Business continues widely miscellaneous, but the tonnage is no heavier. Mill operations are declining.

Shapes.—Some of the larger eastern and western Pennsylvania makers claim to be holding to 1.30c, Pittsburgh, or 1.45c, Philadelphia, except on car material and other large tonnages. There is continued evidence, however, that 1.25c, Pittsburgh, is being done in the regular trade, in this district, even on some comparatively small lots and the market is weak. New orders are not coming in any better. The Baltimore & Ohio railroad asks 1,000 tons of shapes for shop work in addition to a tonnage of other materials.

Sheets. — Buyers of the heavier grades of sheets still are putting forth their requirements cautiously and are closing only for quick delivery. Prices range from 1.60c to 1.65c, Philadelphia, or 1.45c to 1.50c, Pittsburgh, for No. 10 gage, blue annealed.

Semi-Finished Material.—The lower market on domestic billets continues to make unlikely any extensive importation of foreign steel into the eastern seaboard belt. An inquiry for 1,000 to 2,000 tons of small open-hearth billets for an eastern Pennsylvania consumer is before sellers. Otherwise the market is quiet. Prices remain $23 to $24, delivered, this district, for rolling billets, with forging steel $28 to $29.

Old Material.—The most interesting and probably quite significant development in the scrap market is the reappearance of some exportation of old material due to the extremely low stage of prices. Several hundred tons of car wheels have been sold for Belgium and it is understood that favorable opportunities now exist for the shipment of heavy steel and other grades to Belgium, Italy and other countries. This development may check the long decline in scrap. The past week has seen some further weakness. One steel maker obtained several thousand tons of heavy melting steel at $10.25, delivered. A tonnage of rerolling rails went at $12.75, delivered.

Newhall Rolling Mill Operating

The Newhall Engineering Co., Philadelphia, has started operations at its rolling mill at Hyde Station, Clearfield county, Pa., and is now rolling light steel rails, sections from 16 to 45 pounds per yard, and is prepared to make prompt deliveries.

This mill was built by the Clearfield Steel & Iron Co. several years ago and was designed by Julian Kennedy, the equipment being furnished by the United Engineering & Foundry Co., Pittsburgh, so that it is entirely modern in every respect. The finishing end of the mill and hot-beds are practically the same equipment as a standard section rail mill. The heating furnaces are continuous and served with hydraulic pusher. Much of the auxiliary equipment is electrically operated from current generated at the mill.

The Newhall Engineering Co. will also store and ship relaying rails from its yards at the mill, in addition to shipping relaying rails from its storage yards at Williamsport.

Rumors of Low Prices at Cincinnati

With Uncertainty as What Minimum Quotations Are on Southern Pig Iron—Southern Ohio Market Weak

BY S. G. BACKMAN

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg.,
Cincinnati, Nov. 18.

Pig Iron.—The market has grown somewhat uncertain as a natural consequence of several weeks of pronounced inactivity and there is now more or less doubt as to minimum quotations on both southern and southern Ohio iron. Rumors of last week that orders are being solicited in several cases as low as $10.50, Birmingham basis, for southern No. 2 foundry iron for delivery over the next month or two, are now reported to be true, but it is not definitely known that any sales have been made at this figure. It is known, however, that at least one Alabama and one Tennessee furnace have recently quietly solicited business at $10.75, Birmingham, for shipment extending into the first quarter. The majority of furnaces throughout the south, however, are holding at nothing less than $11, Birmingham, for first half shipment, and in several instances sales have been made at $11.50, Birmingham, for that delivery. It therefore appears that at present there is a somewhat wide range in prices throughout the south, due to a large extent to the fact that there have not been enough transactions recently to form a satisfactory basis of comparison of quotations. There is still somewhat of an uncertainty existing here in regard to the reported sale by an Alabama furnace last week of 20,000 tons of low grade foundry iron to the United States Cast Iron Pipe & Foundry Co. on a basis of $10, Birmingham, for No. 2 foundry. Dealers here generally believe that the sale was made, but are inclined to believe that the price paid was not so low because of the small differential now existing between the lower and higher grade foundry irons. It is generally admitted that basic iron is not so strong as foundry iron, and quotations of $10.50, Birmingham, are not difficult to obtain on this grade.

The southern Ohio situation is probably not so strong as it was a week or so ago, and $13.50, Ironton, for No. 2 foundry iron for first half, is now somewhat of an open quotation. A few furnaces, however, are still holding at $14, Ironton, for this delivery. Basic iron is also not so strong in this district as foundry iron, and, if taken in large lots, could probably be had at figures slightly below $13.50, Ironton.

Although a few of the dealers here report a slightly better inquiry during the past few days, it is probably true that a number of these have been sent out more for the purpose of feeling the market than of buying. Most of them, also, call for very small lots. It is very evident that the market at the present time is in a state of suspension and liable to take a turn for either the better or worse at any time, depending entirely upon the developments that occur within the near future.

Coke.—Reports from the Pocahontas district indicate that operators there have practically contracted for their production up until next July, especially on foundry coke. This could also be said to be the case with New River operators, and to a certain extent with some of those in the Wise county district. Also, coal has been selling at such a good price from both the Pocahontas and New River fields that the operators are indifferent in many instances as to whether they turn it into coke or not. However, they must produce a certain amount of coke each week in order to keep a certain per cent of their ovens in operation. To counterbalance this, however, the market has been very quiet recently, and as a consequence, prices in most of the fields have been gradually slipping as consumption and production have become about even. Connellsville prices are probably weaker than those in any of the other fields, as production there is much greater in proportion to the others. There are occasional complaints of a shortage of labor and of railroad equipment, especially box cars.

Finished Material. — Specifications with the local sheet mill have been rather good during the past week and it does not appear as though the usual fall buying is entirely over. Most of the orders received, however, call for nearby shipment, which indicates that dealers and users are anxious to secure their full requirements before winter. Prices are unchanged at from 2.15c to 2.20c on black sheets, No. 28 gage, and from 3.15c to 3.20c on galvanized sheets, No. 28 gage, f. o. b. Newport (Ky.) and Cincinnati, the above quotations applying to Cincinnati territory.

Warehouse business is very slow, the demand during the past few weeks having been practically at a standstill. Prices are unchanged, although a somewhat large reduction has recently been experienced in both the St. Louis and Chicago markets. From all appearances it would seem that there will not be much of a betterment before the first of the year, as the fall buying movement, as far as warehouses are concerned, appears to have been about ended. What little demand there is seems to be rather generally distributed among the articles carried.

Old Material.—Demand for scrap in this territory has shown no signs of improvement during the past week and the market continues at a very low ebb. Prices are reported the same, principally because there is not enough business being done to form a basis for any change. In fact, there has been no general level of prices here for several weeks, as quotations on all transactions have been governed by the conditions surrounding them. Stocks in dealers' yards and the surplus of scrap available through this territory are gradually increasing, all of which has had a tendency to hold the market down. The present weakness of pig iron has also had a bad influence upon the scrap market. Foundries in this territory are not very busy and are buying only very small lots as their requirements actually demand.

Domhoff & Joyce Forces Meet

A general meeting of officials, salesmen and office forces of the Domhoff & Joyce Co., pig iron and coke broker, with headquarters in Cincinnati, was held on Nov. 13, at the Hotel Severin, Indianapolis. A business meeting was held in the morning, after which the plants of the Citizens Gas Co. and the Indianapolis Gas Co., which is also operated by the Citzens Gas Co., were inspected. The meeting terminated with a banquet at the hotel in the evening at which John Sargeant, president of the Domhoff & Joyce Co., presided. The following officials of the company were present at the meeting: John Sargeant, president; C. H. Domhoff, P. M. McClanahn, C. H. Jenkins, Chicago manager, W. G. Maguire, St. Louis manager, A. H. Vollmer, Cleveland manager, Joseph D. Morten, Indianapolis manager, Chas. A. Sargeant, secretary, W. H. Underwood, W. T. Morris and Clarence Hayward.

The General Electric Co., Pittsfield, Mass., has placed an order for four 50-foot traveling cranes.

Price Shading Takes Buffalo Tonnage

But There is Very Little Activity—Quick Shipment Demanded—Canadian Business Shows Improvement

BY FRANK R. DOLBEE

Office of THE IRON TRADE REVIEW,
Buffalo, Nov. 18.

Pig Iron.—The week's sales totaled about 8,000 tons of all grades. There remains to be closed inquiry from one source for about 2,500 tons of foundry iron and several lots for 1,000 to 1,500 tons each and some smaller amounts. Taken as a whole, the market, however, is considered both quiet and flat. Consumers are not only conservative but cautious as well. The attitude taken has caused a further softening in prices. The tonnage booked for the week was done largely through one office where the shading from last week's schedule brought out a moderate degree of buying. The market is in such shape that only a nominal difference in price exists between the various grades, covering a spread of but a single dollar between the minimum quotation on low grade iron and the top price being asked on the high grade foundry irons, all being within the range of $13.50 to $14.50. Actual trading has cut this spread in half in some instances, as a considerable tonnage of gray forge was reported placed at $13.50 and one interest is quoting $14 flat on No. 1 foundry at the furnace.

Specifications for iron under contract are coming in with insistent demands for immediate shipment, showing the close margin on which consumers are working, with stocks down to practically the vanishing point. One furnace during the week established its record day for shipments, sending out 59 cars and five canal boats loaded with foundry grades and some malleable iron. The other days of the week were also heavy ones from the forwarding standpoint. A factor in this situation is said to be the fact that many foundries are having a heavier melt than they anticipated. Hence the urgent shipping instructions.

Finished Material.—The buying of the week represents but a moderate tonnage and the inquiries are of such a miscellaneous character that they evidently represent efforts on the part of consumers to balance their stocks. The general situation remains about the same as it was a week ago. Specifications call for immediate delivery, followed by urgent requests for the material being made upon the mills and agencies. The asking price on bars is 1.35c, base, but favorable tonnages and specifications can be closed at 1.30c. Conditions are the same with reference to shapes, plates and structural. In the competition to get what new business there is appearing structural has been shaded as low as 1.30c base.

Some of the interests look for no decided change in the situation for the next three months, or until the advance spring buying begins. The impression prevails here that prices, while not firm, will be more apt to remain around the present quotations than to sag to the low prices of the schedules obtainable several years ago.

In the Canadian market, business is reported to be better than it is here, although money continues to be rather tight on the other side of the border.

Inquiry is light in wire and wire products, the market is no stronger, sales are but moderate as the users are looking for lower prices. Wire nails are reported to be off $1 a ton from some producers, but no reduction is recorded in wire schedules, which remain the same as previously quoted.

Black and galvanized sheets are fairly active at easier prices. Tin plate contracts continue to come in on the $3.40 basis. This price seems to satisfy the consumers who look for no further reduction but are anticipating a possible increase in the schedule.

Old Material.—Dealers in this market have not felt as yet a tendency on the part of manufacturers to reduce costs by returning to the use of scrap. The market is not only quiet but weak as well. There has been a little movement of heavy melting steel to the valley and eastern Pennsylvania users at low figures, but the volume has been moderate. Consumers have made offers for various lines at low rates, but the figures they propose are not acceptable to the dealers, causing the practical standstill noted at this time. The scrap yards have softened prices generally, but apparently not enough to bring out new business.

Will Protest Against Law

A convention of American manufacturers has been called by the Registration League to meet at the Hotel Astor, New York City, Nov. 21, to protest against the Kahn law, which it is claimed offers considerable danger to American manufacturing interests. The law's ostensible purpose is to protect foreign exhibitors at the Panama-San Francisco exposition from the infringement of their patents or trade marks by providing that there shall be no copying of these trade marks or patents where they have been protected by their native laws and have been registered at a branch of the department of patents to be established in connection with the exposition. The Registration League claims that under the law many products manufactured here which have not been protected at home but have been copied abroad by foreign makers, would have to be abandoned. The aspects of this law were discussed editorially in the issue of The Iron Trade Review of Oct. 30.

Must Use Steel.—The county commissioners of Hamilton county, O., on Nov. 14 adopted a resolution ordering the C. & O. of Indiana railway to remove all wooden pilings and superstructures from its bridges in that county and to replace the same with steel structures immediately. The resolution was adopted because of the failure of the railroad to carry out an agreement made Sept. 3, 1902, to replace the wooden structures with steel within ten years. The resolution affects bridges spanning the Ferguson road, the Werk road, the Hearn road, the Bridgetown road, the Cleves and Bridgetown pike, the Hutchinson road and the Taylor's Creek road, all in Hamilton county, and when the above changes are made, will involve several thousand tons of steel.

The McDonough Mfg. Co., Eau Claire, Wis., advises it is in the market for a quantity of 4¼ x ⅞-inch finished machine steel, mill or finished stock preferred, but cold rolled can be accepted, if necessary.

Announcement is made by William P. Palmer, president of the American Steel & Wire Co., that the new mills at Fairfield, Ala., will be making wire and nails by the first of the year.

The Panama Rubber Co., Los Angeles, Calif., advises its plans are not sufficiently advanced to give definite information as to the machinery necessary to equip the plant.

Light Buying in Metropolitan District

With Prices of Pig Iron Unsteady—Tennessee Company Denies Selling Large Tonnage to Cast Iron Pipe Company

BY C. J. STARK

Office of THE IRON TRADE REVIEW,
503-4 West St. Bldg.,
New York, Nov. 18.

Pig Iron.—Light buying and uncertain prices are still the conspicuous features of the pig iron market in the metropolitan and nearby districts. The recent weakening of Buffalo iron to a basis of $13.50, furnace, for No. 2X, at which level it does not appear to be very strong, has established the competitive market at tidewater at $15.25 to $15.50, delivered. Not in all cases, however, will eastern Pennsylvania producers revise their schedules to meet these prices. Future sales of Buffalo iron at $13.50, furnace, for No. 2X have been noted this week, largely in New England territory and have involved lots of 500 tons or less. It develops that the recent purchase of a Bristol, Conn., consumer, for first half, as low as $15.50, delivered, was quoted on 1.50 and over silicon iron, but the 1,500 tons taken at this figure went to a New York State maker with an advantage of 50 cents in freight over Buffalo makers. The remainder of the high and low silicon iron purchased by this consumer was done at $15.70 to $15.95, delivered, and went to Buffalo and Central Pennsylvania makers. One inquiry for 1,200 tons of foundry for this district remains open and a Jersey machinery builder asks 450 tons. The American Steel & Wire Co. has taken 2,000 to 3,000 tons of standard low phosphorus iron from a New York State maker for Worcester delivery, and a buyer in this territory bought 200 tons of this grade. A current report that the Tennessee Coal, Iron & Railroad Co. had sold 20,000 tons of southern iron at a low price to the United States Cast Iron Pipe & Foundry Co. is officially denied by the former. The leading pipe maker, it is known, however, is actively negotiating.

Ferro-Alloys.—Sellers of ferro-manganese usually are able to obtain $50, seaboard, on English material, but the business moving is in such small lots that it is uncertain what might be done on a tonnage. Reports occasionally arise that the $50 level can be shaded. German ferro continues to sell below English. Inquiries for other alloys are few.

Plates.—Prices of a shade below 1.25c, Pittsburgh, or 1.41c, New York, are reported to have been made for delivery in this district by the more aggressive sellers. The open range of the market, however, remains 1.25c to 1.30c, Pittsburgh, and it usually requires a tonnage of some attractiveness to obtain the inside figure. The market remains quite restricted and new tonnage is light. In a moderate way, there continues some increase in equipment orders and negotiations. It is estimated by builders that from 8,000 to 10,000 cars now are in the market, upon which there is a reasonable prospect for early action.

Structural Material.—Buyers of any tonnages of size are able quite freely to obtain a price of 1.25c, Pittsburgh, or 1.41c, New York. On the unusually large tonnages such as those for the car builders, or similar heavy buyers, it is by no means certain that 1.25c, Pittsburgh, is the firm level of the market; in fact, the inference is held out by makers that this price could be shaded on orders of this type. Some mills are proclaiming their minimum at 1.30c, Pittsburgh, but they are geting little competitive business and sales at this figure are usually small. New requirements in this district still are being placed very slowly.

Cast Iron Pipe.—Makers report a better inquiry from private buyers for spring delivery than usually is received at this period. Apparently, these buyers are taking notice of the attractive prices now being made. Apart from this feature, the market is quiet. Belleville, N. J., is asking for 175 tons of small pipe. Prices are soft, being shaded in accordance with the desirability of the order.

Iron and Steel Bars.—Another inquiry for 1,000 tons of steel bars for special reinforcement work in connection with the new buildings of the Massachusetts Institute of Technology, has come out, but it is doubtful whether this order will be placed. Early shipment buying of bars is the principal branch of new business, but there is not a great deal of this being done. A price of 1.30c, Pittsburgh, or 1.46c, New York, has become more prevalent. Iron bars are weak, but prices still show considerable range. Common bars can be had as low as 1.20c, mill, but some makers hold them higher and the range for New York delivery is about 1.25c to 1.35c.

Old Material.—A considerable portion of recent sales of 10,000 to 15,000 tons or more of heavy melting steel for Johnstown and other western Pennsylvania points, has been filled in the east by dealers. These orders were taken at $12, delivered, and in covering upon them from $9 to $9.25, New York, was paid. These western Pennsylvania consumers are no longer paying these prices and the local market has dropped back to the level governed by the eastern Pennsylvania situation, where steel sold this week at $10.25 to $10.50, delivered. Dealers' prices for heavy steel are now about $8.25, New York. No scrap grades are showing much life and the market remains dead. Dealers here have not yet engaged in any exportation of scrap such as is reported from Philadelphia.

Will Proceed With Canadian Plant

Whatever reports to the contrary may have been in circulation, it is learned from high officials of the United States Steel Corporation that there has been no change in the plans for proceeding with the construction of the new Canadian works at Ojibway, Ontario. The present plan as it has heretofore been outlined is to work out all details of the new works and to let some of the construction contracts during the winter so that actual building may be inaugurated with vigor when spring weather opens. It is now stated the beginning of active work in the spring will come regardless of the possible development of more unfavorable trade conditions.

Recent conferences have been held by the proper committees of officials, in whose hands has been placed the construction of the plant, looking towards laying out the new townsite about the projected works and similar matters. It is understood drawings for blast furnaces, steel works and rolling mills, which the new plant will comprise, are practically complete.

Lindabury's Visit.—Richard V. Lindabury, counsel for the United States Steel Corporation in the dissolution suit, conferred the latter part of last week with Assistant Attorney General Todd at Washington. The conference had nothing to do with matters pertaining to the Steel Corporation.

The Chamber of Commerce, Erie, Pa., has received word from the Christy Front Drive Truck Co., Hoboken, N. J., that the site offered in that city is preferred to others. The company purposes establishing a plant to manufacture automobile fire trucks.

BETTER PRICES

To Large Buyer Says Witness in Corporation Suit.

Charles F. Tuttle, of the Tuttle & Bailey Co., New York, testified at the Steel Corporation hearings Monday, that his company is a manufacturer of patented appliances, such as ventilating apparatus, etc., and uses great quantities of hoops and bands. Its requirements in these commodities it secures on a contract basis. The firm first sends out inquiries to various makers and then places the contract with whichever concern will quote the most favorable terms. At all times, said Mr. Tuttle, there is a variation in the prices quoted and there is active competition between all the steel makers, so far as he can judge.

Allen M. Foster, vice president and general manager of the Foster Bolt & Nut Mfg. Co., Cleveland, said his company manufactures bolts, nuts and small rivets. It is a large buyer of steel, using about 500 tons a month of bars, rods and wire. He said since the formation of his company in 1909, about 30 to 40 per cent of the Foster company's requirements have been furnished by the Steel Corporation subsidiaries. All contracts placed for material by the Foster company, he said, are based on the best prices obtainable after competitive bids had been received from the makers.

William D. Taylor, president of the National Hardware Jobbers' Association and president of the Geo. H. Worthington Co., Cleveland, testified his is the largest jobbing concern in the middle west. He stated the Worthington company engages in a great many lines. It buys on a competitive basis all the steel products which it handles, placing the orders with whichever concerns will quote the best prices and deliveries. Mr. Taylor was put through a lengthy cross examination by Judge Dickinson, of government counsel, who endeavored to have the witness admit that the Worthington company, because of its large requirements, is able to obtain better prices than smaller jobbers can obtain. Mr. Taylor first denied that this was so, but later said that by buying large lots, his company is able to get a lower price.

George Israel, secretary and treasurer of the Mt. Vernon Bridge Co., Mt. Vernon, O., said that his company buys its structural steel requirements on a contract basis. It also purchases steel for special jobs, which are not covered by the regular contracts. All of the steel used by the Mt. Vernon company, however, is bought on a competitive basis. Various steel mills are asked to submit bids, and contracts are awarded to the mills quoting the best prices and deliveries.

George Bartol, president of the Otis Steel Co., Cleveland, on Tuesday recounted the important historical steps in the development of his company and described the new plant which it is now erecting in Cleveland. The Otis Steel Co., he said, makes steel plates and steel castings principally, and also some forgings. In reference to the so-called "Gary dinners", Mr. Bartol testified that they were merely "get together affairs" and that they were not held for the purpose of fixing prices. The witness testified that competition between the makers of steel plates is very keen.

Isaac G. Haas, president of the Empire Plow Co., Cleveland, testified that in 1901 to 1905, he sometimes purchased his material at what was known as the "pool price". During this period, he said, he frequently was able to make purchases at less than the pool price. Mr. Haas testified that he buys his steel plates and other raw material on a competitive basis. Mr. Haas said that his purchases are generally made at lower prices than the quotations which are set forth concurrently in the trade papers.

Higher Price for Furnace Coke

Pittsburgh, Nov. 19. (By wire.)—Insight into the future of the furnace coke market was offered today on the report of the sale of 12,000 tons a month for the first half of next year at $2.15, ovens. Full particulars of the sale are not obtainable, but confirmation of this transaction indicates that the market is stronger than some buyers believed a week ago. Several negotiations for first half blast furnace fuel are pending. It is reported that Pickands, Mather & Co. have closed for additional November coke for shipment to furnaces at Toledo. Prompt furnace coke is being sold at $1.75, ovens, or 10 cents less than previously, but sales do not involve large tonnages.

Furnace Plans of Thomas Iron Co.

The Thomas Iron Co., Easton, Pa., advises as to some changes being made to its blast furnace group which have caused reports to be put forth that it is planning some important new construction. The company has been preparing to reline and make other repairs to its No. 3 Hokendauqua stack, one of its two modern furnaces, which was blown out last May, but all work has been stopped for the present. The No. 4 Hokendauqua furnace of the company was dismantled some time ago. Lately the company has been tearing out some of the old stone work. On Nov. 6, the company blew in its No. 7 Lock Ridge furnace at Alburtis, Pa., which is run on all-anthracite coal. Furnaces Nos. 7 and 8 of this plant probably are the only anthracite furnaces now running. They make only about 60 tons a day. Stack No. 7 was blown in to take care of an order for iron that can be shipped from Alburtis under a more advantageous freight rate, and at present the company has both anthracite furnaces, Nos. 7 and 8 Alburtis, and one coke furnace, No. 1 Hokendauqua, in blast.

Obituaries

Henry Endicott, formerly of the firm of Allen & Endicott, Cambridge, Mass., died at his home in Cambridge on Nov. 8. Mr. Endicott was born in 1824. In the early 50's he began the manufacture of engines and boilers in Boston, but removed the works to Cambridge in 1858. He ceased active connection with this business in 1874 and thereafter devoted his time chiefly to other interests.

Stephen Bull, of Racine, Wis., one of the founders of the vast J. I. Case Threshing Machine Co., and one of the best known manufacturers in the country, died at Racine on Saturday, Nov. 15, aged 91 years. Mr. Bull had been failing rapidly for several weeks and the end came not unexpectedly.

Frederick F. Fischer, Mt. Lebanon, Pa., died last week, aged 50 years. He was a member of the firm of Fischer & McKallip, founders and machinists, operating a plant on the South Side, Pittsburgh. Mr. Fischer was a graduate of Stevens Institute.

Edward F. Morse, inventor of the Morse chain and of the Morse thermo gage for measuring the temper of steel, both of which gained for him a high standing in the mechanical engineering world, died Nov. 7 at his home at Ithaca, N. Y., aged 56 years.

Orders Coming In.—The West Penn Steel Co., Brackenridge, Pa., is operating five out of ten hot mills this week. The finishing department is running full time. Orders have been coming in in good volume this week and full capacity will be in operation next week.

Walter Wood, of R. D. Wood & Co., Philadelphia, sailed Nov. 15 on a business trip to Europe.

FOREIGN INVASION

Discussed by Mr. Lukens, Who Has Been Investigating Abroad.

Germany and Belgium are the most likely sources for the importation of steel products to the United States, but little opportunity now exists for these makers to compete with domestic prices along the Atlantic seaboard except in some of the smaller and most highly finished products.

This is the way Lewis N. Lukens, manager of the finished steel department of Matthew Addy & Co., Real Estate Trust building, Philadelphia, summarizes the present outlook for a foreign trade invasion in this country in steel, after a careful study of conditions abroad. Mr. Lukens has just returned from an extended tour of the principal steel-making countries of Europe, where he carefully familiarized himself with prices, material standards and general trade customs to appraise the chances for interesting home consumers in foreign steel products.

"There is practically no opportunity today to bring in either English finished or semi-finished products to this country," said Mr. Lukens. "This, of course, does not apply to the very highly finished steel, such as tool steel, which regularly finds a considerable market in the United States. England today is importing several million tons of steel from Germany for her own needs. Furthermore, English steel makers have in view the present naval program, which, it is expected, will provide them with a lot of profitable business.

"In Germany, all the billet output is controlled by the Stahlwerks Verbund, or German Steel Syndicate. At the prices they now quote, their Siemens-Martin billets, which correspond to our open-hearth steel, delivered to consumers in the eastern seaboard zone, of the United States, are about upon a parity with the quotations in the same district now being made by domestic makers. The Germans also are able to offer at about the same price liberal quantities of their basic-Thomas steel billets, which are similar to our Bessemer billets.

"On either German or Belgian finished products, I find it is only the lighter and more highly finished forms that can offer any particular inducement to American consumers at this time, and this can be true at points only a short distance inland from the seaboard. There are a number of disadvantages which foreign steel is obliged to overcome to compete with the American product, and all of these add to the protection of the latter. One of the important factors of this kind is that of credits. When purchasing ahead, buyers cannot obtain as liberal credit allowances as in this country and such transactions would be more strictly upon a cash basis.

"When compared to our mill price, the German or Belgian mill price for semi or finished products seems low, especially if the latter plant is located some distance from the seaboard. Yet to bring that material to Antwerp and to add to it the freight duty, incidental and other necessary charges, etc., sufficient to lay it down on docks at Philadelphia, would represent a price which in the great majority of finished lines would not be competitive with the home product delivered at consumers' plants."

POOR PROSPECTS

For Foreigners to Sell Products on the Pacific Coast.

San Francisco, Nov. 13.—Consumers of iron and steel products are not taking very kindly to the idea of importing from Germany. Insurance, wharfage, cartage, inferior material, cost of handling, removal of rust, etc., increase the cost of the foreign product and make the handling of foreign products undesirable. Charges included in the items above mentioned sometimes make a difference of $5 per ton. Those who have had experience in importing are not anxious to try it again. One company which attempted to use a large amount of foreign material in some harbor improvement work had to submit it to inspection of engineers, who condemned all of it. The price of American plates is the Pittsburgh quotation plus 80 cents a hundred pounds by rail and 65 cents a hundred pounds by steamer.

The Russellville Iron Works, Russellville, Ark., has taken over the Russellville Plumbing Co. Officers of the reorganized company are: President, W. J. White; vice president, J. M. Ball; general manager, T. F. Hoye; treasurer, John W. White.

The Fulton Drop Forge Co., Canal Fulton, O., is adding to its plant to care for increased business. The addition will be 30 x 60 feet. Some new equipment will be needed, including a large shear.

Fourteen houses are ready for roofs and 68 foundations are in at the model town of the Minnesota Steel Co., Spirit Lake, Minn.

ENGLISH STOCKS

Continue to Decline—Little Change in Furnace Activity.

The decline in English pig iron stocks continues steadily. On Nov. 6, the iron in store at Middlesbrough amounted to 156,415 tons, compared with 158,281 tons the preceding week or a loss of 1,886 tons. The reduction of stocks in the Middlesbrough district from the first of the year to Nov. 6, was 85,208 tons. In the Cumberland district, iron in store as of Nov. 6, totaled 11,240 tons, a reduction in the week of 785 tons and in the year to date of 75,183 tons.

Furnaces in blast in the Middlesbrough district on Nov. 6 numbered 81, which was the same as the preceding week and compares with 89 on the corresponding date in 1912. In the Cumberland district, the operations of the week ending Nov. 6, when 24 furnaces were blowing, showed a loss of two stacks from the preceding week, and also was two below the number on the corresponding date in 1912. In Scotland, there were 80 stacks blowing on Nov. 6, the same as the preceding week, which was eight less than the number active on the corresponding date in 1912.

A summary of the stock conditions in the Middlesbrough and Cumberland district in recent weeks with the number of furnaces blowing shows the following:

MIDDLESBROUGH DISTRICT.

		Stocks.	Furnaces.
Nov.	6	156,415	81
Oct.	30	158,281	81
Oct.	23	164 837	81
Oct.	16	167,099	81
Oct.	9	168,474	81
Oct.	2	170,848	81
Sep.	25	171,887	83
Sep.	18	175,803	85
Sep.	11	179,360	88
Sep.	4	183,140	89
Aug.	28	187,269	..
Jan.	1	241,623	..

CUMBERLAND DISTRICT.

		Stocks.	Furnaces.
Nov.	6	11,240	24
Oct.	30	12,025	26
Oct.	23	12,889	26
Oct.	16	13,189	26
Oct.	9	13,899	26
Oct.	2	16,968	25
Sep.	25	17,720	25
Sep.	18	18,181	24
Sep.	11	18,829	24
Sep.	4	19 601	24
Aug.	28	19,761	..
Jan.	1	36,423	..

Resume Operations.—The Interstate department of the Allegheny Steel Co., Brackenridge, Pa., was put into operation last week, after being closed down eleven weeks for repairs. A new engine was installed. The company is operating half of its capacity this week, but will probably operate in full next week.

Worst Storm in History of Great Lakes Navigation

Causing the Loss of 19 Vessels and 254 Lives—Remarkable Features of Disasters Illustrated by the Experience of the H. M. Hanna Jr.

The storm which destroyed so many ships on Lake Huron a week ago last Sunday, was the most severe in the history of lake navigation, not because wind velocity was greater than that of previous storms, but that it was so long continued. The wind blew with an average velocity of 60 miles per hour with frequent gusts reaching between 70 and 80 miles an hour, and this continued for a period of nearly 18 hours, whipping up enormous seas in which it was practically impossible for vessels to live. Moreover, masters were caught more or less unawares in it. It was generally known that a northwest gale had been prevailing on Lake Superior since Saturday, keeping many vessels in port, but a northwest gale would not ordinarily be dangerous on Lake Huron, as the vessels would have the benefit of a lee shore. The gale on Lake Huron was unmistakably a northeast gale. The wind must have shifted its direction somewhere in Canadian territory and whipped around into Lake Huron.

The Weather Bureau probably had no means of obtaining information of this shift, for the storm warnings given indicated a northwest gale. That its violence was unprecedented is shown by the wreckage along the eastern shore of Lake Huron. The canal at Port Huron, ordinarily 30 feet wide with an 8-foot depth of water, is now 80 feet wide and filled to a depth of 8 feet with pure sand, extending back from the lake front over 1,000 feet. This sand was carried into the canal basin by waves that were breaking over a breakwater in front of the canal. The whole shore from Port Huron to Harbor Beach is strewn with wreckage that had probably been lying at the bottom of Lake Huron for 25 years or more. The embankments were practically eaten up, the beach now extending 200 feet inland beyond its former line, and houses that were formerly well set back are touching the newly-made beach.

The experience of the steamer H. M. Hanna Jr., owned by W. C. Richardson & Co., of Cleveland, whose crew were fortunately saved, is probably typical of the experience of all the steamers that were out in the storm. This steamer left Port Huron about seven o'clock on Sunday morning. The sea was quiet, a light wind prevailing and an exceedingly low barometer, but nothing more significant. When the Hanna was practically abreast of Harbor Beach, the wind seemed suddenly to spring from all directions with incredible violence. In an instant, hundreds of tons of water swept over the steamer aft, wrecking the steel plates of her deck house, tearing the after cabin loose and sweeping it overboard. The Hanna, one of the best-built boats on the lakes, had 9,100 tons of coal aboard and was in first-class fighting trim. She could not be kept head to sea, however, though her engine was wide open. The waves fought her gradually into the trough and while she would gain a point or two, she would lose it again when her screw got out of water. Meanwhile, the sea kept tearing at her, ripping her hatch covers off, flooding the engine room with water and finally slamming her up against the reef with such energy as to break her in two. Her starboard life boat was swept overboard, but six men managed to reach the shore in the port life boat. The life-saving crew rescued the rest of the crew. The Hanna lies well inshore and has been abandoned, as it is practically impossible to get her back into deep water.

One of the great mysteries of the storm for several days was an unknown ship floating upside down about 13 miles northeast of Fort Gratiot light. A diver subsequently identified the ship as the Charles S. Price, of the fleet controlled by M. A. Hanna & Co., of Cleveland, but some question has been raised as to this, and a further examination will be made.

Nineteen vessels altogether were total losses, and scores in addition received heavy damages from strandings. Altogether 254 persons lost

TOTAL LOSSES

Vessel.	Carrying capacity, gross tons.	Valuation.	Location.	Owner.
Str. Louisiana	2,800	$20,000	Washington Island, Lake Michigan	Thompson Steamship Co., Cleveland, O.
Str. L. C. Waldo...	7,000	175,000	Manitou Island, Lake Superior	Roby Transp. Co., L. C. Waldo, mgr., Detroit.
Str. Wexford	2,800	80,000	Foot of Lake Huron....	West'n Steamship Co., Ltd., 72 Bay St., Toronto, Ont.
Str. Turret Chief....	3,100	80,000	Copper Harbor, Lake Superior	Canadian Lake & Ocean Nav. Co., Ltd., Toronto.
Str. H. M. Hanna Jr.	8,500	325,000	Pointe aux Barques, Lake Huron	The Hanna Transit Co., W. C. Richardson & Co., mgrs., Cleveland, O.
Str. Matoa	3,104	70,000	Pointe aux Barques, Lake Huron	Pittsburgh Steamship Co., Cleveland, O.
Str. Leafield	3,500	80,000	Angus Island, Lake Superior	Algoma Central Steamship Line, Sault Ste. Marie, Ont.
Str. Argus	7,000	136,000	Lake Huron	Interlake Steamship Co., Cleveland, O.
Str. Hydrus	7,000	136,000	Lake Huron	Interlake Steamship Co., Cleveland, O.
Str. Chas. S. Price..	9,000	340,000	Lake Huron	Mahoning Steamship Co., M. A. Hanna & Co., mgrs., Cleveland, O.
Str. Isaac M. Scott.	9,000	340,000	Lake Huron	Virginia Steamship Co., M. A. Hanna & Co., mgrs., Cleveland, O.
Str. Jas. Carruthers..	9,500	350,000	Lake Huron	St. Lawrence & Chicago Steam Nav. Co., Ltd., Toronto, Ont.
Str. John A. McGean	7,500	240,000	Lake Huron	Pioneer Steamship Co., Hutchinson & Co., mgrs., Cleveland, O.
Str. Henry B. Smith	10,000	350,000	Lake Superior	Acme Transit Co., Hawgood & Co., mgrs., Cleveland, O.
Str. Regina	3,000	80,000	Lake Huron	Merchants Mutual Line, Toronto, Ont.
Bge. Plymouth	600	5,000	Gull Island, Lake Michigan	McKinnon & Scott, Menominee, Mich.
Bge. Halsted	500	5,000	Green Bay, Lake Michigan	Sooer Lumber Co., W. E. Holmes & Co., mgrs., Chicago, Ill.
Lightship No. 82....	...	20,000	Point Abino, Lake Erie..	U. S. government.
Tug Lafayette	...	12,000	Lake Superior	Great Lakes Towing Co.

their lives in the storm. A fund is now being raised for the relief of their families. The vessels destroyed were valued at $2,900,000. A table giving the details of the losses is incorporated in this article.

MORE LIVELY INTEREST

Shown by Railroads—Large Mississippi Bridge Tonnage in Prospect.

Car orders placed by the railroads during the past week announced in that period reached about 1,500, in addition to one contract for 1,100 underframes. The orders, though small, were distributed among a number of lines and indicate a better interest by the railroads in equipment requirements. Considerable activity continues in the market for track fastenings. The Atlantic Coast line is inquiring for a large tonnage of splice bars and other roads still figure on quantities of most splice bars and tie plates. The Atlantic Coast line asks 2,500 tons of spikes, the Baltimore & Ohio 1,000 kegs and the Seaboard Air Line 1,000 kegs. Rail orders still are coming a little slowly and usually are small. The latest information regarding the Pennsylvania rail order is that it is not likely to be placed this month. Some contracts have been placed for the substructure for the large two-track bridge to be erected jointly across the Mississippi river at Memphis by the Rock Island and other lines. This is taken to signify that contracts shortly will be asked on the steel, estimated at about 30,000 tons. Bids on three sections of New York subway extensions aggregating 14,000 tons went in the past week.

The letting of contracts for the construction of the Cleveland & Youngstown R. R., a line which will pass through the Shaker Heights district, connecting it with the central part of the city by rapid transit, will soon be begun. Among the first contracts to be awarded will be 150 tons of reinforcing bars, in about 30 days. There will also be considerable structural material to be awarded later. W. E. Pease, 235 Superior avenue, is the engineer in charge.

Most of the car inquiries recently prominent in the west have disappeared from view, leaving very little to be figured on. Careful market observers have given up hope of any sustained volume of railroad business until spring.

Charles A. Finley, acting director of public works, Pittsburgh, will receive proposals until 10 a. m., Nov. 24, for the erection of the steel work for the Bloomfield bridge to span tracks of the Pennsylvania and Baltimore & Ohio railroads near Thirty-seventh street. The structure will be 1,740 feet long, with a 34-foot roadway and two 8-foot sidewalks. The bridge will be of viaduct construction, with ten 60-foot plate girder spans, four 120-foot truss spans, two 120-foot anchor arms, two 140-foot cantilever arms and seven 20-foot truss spans.

CAR, LOCOMOTIVE AND RAIL ORDERS.

The Lehigh and New England railroad has placed 500 hopper cars with the Pressed Steel Car Co. and still is negotiating for 200 gondolas.

The Wabash railroad has ordered 500 hopper car bodies from the American Car & Foundry Co.

The Bingham & Garfield has placed 25 gondolas or concentrate cars with the Standard Steel Car Co.

The Lehigh Valley railroad has ordered 65 all-steel coaches, ten all-steel smoking and 25 all-steel baggage and express cars. This order is understood to have gone to the Pullman Co.

The Chicago & Northwestern railroad, it develops, has placed 30 baggage, 27 smoking and 8 mail cars with the American Car & Foundry Co. for its own use and also 48 coaches, 9 dining, 6 chairs, 5 observation, 4 parlor and 2 cafe cars with the Pullman Co. for the Chicago, St. Paul, Minneapolis & Omaha railroad.

The Louisville & Nashville has ordered 1,100 steel underframes, of which 800 will be furnished by the Mount Vernon Car Mfg. Co. and 300 by the American Car & Foundry Co.

The Pere Marquette railroad has ordered 1,000 tons of rails from the Pennsylvania Steel Co.

The Baltimore & Ohio railroad has placed 2,500 tons of rails with the Pennsylvania Steel Co.

The Lehigh & New England Railroad has placed 9 locomotives with the Baldwin Locomotive Works.

The Southern Railway of Peru has ordered four superheater consolidation type locomotives from the American Locomotive Co.

The New Jersey, Indiana & Illinois railroad has placed one Mogul freight locomotive with the American Locomotive Co.

CAR ORDERS PENDING.

The Great Northern railroad is inquiring for 50 coaches and 25 baggage cars.

The Northern Pacific railroad is considering the purchase of 140 passenger cars.

The coach inquiry of the New Haven system, which has been reported as 120 passenger cars, now is understood to call for 220 cars.

The Wheeling & Lake Erie railroad, which has been reported in the market for 1,000 hoppers and 500 gondolas, at latest reports, is not expected to place such an order.

The Chicago Great Western is inquiring for 1,250 steel under frames.

BRIDGE AND STRUCTURAL WORK.

Section No. 3 of the Seventh avenue subway line, New York City, 5,700 tons. General contract awarded to Degnon Contracting Co. Steel expected to go to American Bridge Co.

Section No. 2 of the Seventh avenue subway line, New York City, 6,500 tons; original bids upon which the Thos. J. Buckley Engineering Co., was low, rejected and readvertised for Dec. 2.

Section No. 5 of the Seventh avenue subway line, New York City, 3,200 tons. Canavan Bros. Co., low bidder on the general contract. Steel expected to go to the American Bridge Co.

Section of Steinway tunnel, Borough of Queens, New York City, 4,600 tons. Bids opened Nov. 18. Degnon Contracting Co., low bidder.

LIGHT TONNAGES

Make Up the Structural Orders—Some Large Contracts Pending.

The large tonnage for the subway extensions still remains the principal activity of the metropolitan and eastern structural markets. Apart from these requirements, projects usually are small and call for a light aggregate tonnage.

A very restricted volume of structural tonnage is coming out in the west. The total reported last week amounts to only 1,642 tons, divided between two jobs. Throughout the entire west practically no large office building projects are under consideration, and nearly all the railroad bridge business for the present has been placed. Fabricators are not encouraged by the outlook.

The fabricators of the Buffalo district are all busy with business on hand for the present period, but somewhat lower prices have been offered to bring out new orders. The softening that has taken place has developed added tonnages, but only moderate in amount.

STRUCTURAL CONTRACTS PLACED.

Steel barges for the government for use on the Ohio river, about 700 tons, awarded to the American Bridge Co.

Y. M. C. A. building at Hartford, Conn., 400 tons, awarded to the Berlin Construction Co.

Public Schools Nos. 170 and 179, Brooklyn, 700 tons, awarded to the Warren Steel Co., Syracuse, N. Y.

City of Chicago, Lake View Pumping Station, 1,251 tons, to Morava Construction Co.

Illinois Central R. R. Co., express house, Memphis, Tenn., 391 tons, to the American Bridge Co.

Westport power house of Consolidated Gas Co., Baltimore; about 500 tons awarded to Chesapeake Iron Works.

Palace Royal store, Washington, 400 tons, awarded to Dietrich Bros.

Garage for the Loose-Wiles Bakery Co., Brooklyn, 400 tons, steel contract taken by Post & McCord and fabrication will be done by American Bridge Co.

The George Kellogg Structural Co., Buffalo, has been awarded contracts for the steel for the foundry and machine shop of the Foote Mfg. Co., Nunda, N. Y.; for the Phoenix Brewing Co., Buffalo, addition; for the school of Our Lady of Lourdes church, Buffalo; and for the Agronomy building and Stock Judging Pavilion, Cornell University, Ithaca, taking in all about 675 tons.

STRUCTURAL CONTRACTS PENDING.

Loyola High School, Eighty-fourth street, New York City, revised plans issued. Originally figured to require 1,200 tons.

Bids will be opened this week for the new

plant of the Husted Milling Co., Buffalo, taking 500 tons of structural and about 1,000 tons of bars and reinforcing material. The Monarch Engrg. Co., Buffalo, is completing plans and bids will soon be taken for the Clover Leaf Milling Co.'s new 13-story elevator at Buffalo, requiring a large tonnage.

Canavan Bros. Co. submitted the lowest bid Nov. 12 to the Public Service Commission of New York City for the general construction of Section No. 5 of the Seventh avenue subway line, Manhattan. Their bid was $2,401,000. About 3,200 tons of steel will be required. The Degnon Contracting Co. is the low bidder for section No. 3 of the same line, which will require 5,700 tons of steel. This firm's bid was $2,185,000.

Death of Jay M. Pickands

Jay Morse Pickands, of Pickands, Mather & Co., Cleveland, died early Tuesday morning, Nov. 18, at Lakeside hospital in that city, as the result of an operation for appendicitis. Mr. Pickands started on Nov. 3, with Messrs. Samuel Mather and H. G. Dalton, President Clarke, of the Lackawanna Steel Co., President James A. Campbell, of the Youngstown Sheet & Tube Co., and others, on a trip to Lake Superior iron ore mines. On the return trip, he was taken sick at Ludington, Mich., on Nov. 10, and the disease was declared to be appendicitis. He was able to go on to his home, and arrived in Cleveland on Nov. 12, on which day the operation was performed. It was apparently successful, but after a few days, a sudden turn for the worse came and he grew rapidly worse.

Mr. Pickands was born Feb. 21, 1880, at Marquette, Mich., where, at that time, his father, the late Col. James Pickands, was a hardware merchant. Col. Pickands afterward became one of the organizers and senior member of the firm of Pickands, Mather & Co. Jay was graduated from Yale in 1902, and became connected with the firm of Pickands, Mather & Co. in 1903, in the pig iron department. Since 1911, he had been a member of the firm. He is survived by his wife and little daughter, and by two brothers, H. S. Pickands, manager of the dock department of Pickands, Mather & Co., and Joseph O. Pickands, of Cheboygan, Mich. He was a member of the American Iron and Steel Institute and of numerous clubs in Cleveland. Mr. Pickands had great energy and marked ability and gave promise of being a highly successful business man. He had a very large number of friends.

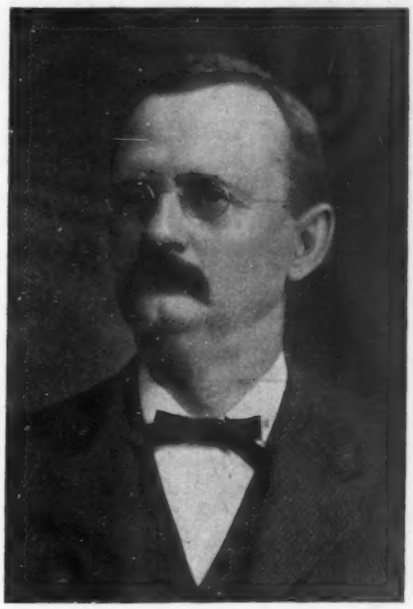
Blows in Stack.—The Republic Iron & Steel Co. has blown in another of the furnaces and its Pioneer group at Thomas, Ala., and all three of these stacks are now in operation.

BRIGGS RETIRES

From Presidency of the National Founders' Association.

New York, Nov. 19. (By wire.)—O. P. Briggs, president of the National Founders' Association, has announced that he will retire from active service in this organization. For seven years he has served as president and two years as commissioner. He will be succeeded by William H. Barr, of the Lumen Bearing Co., Buffalo.

The annual meeting of the National Founders' Association opened at the Hotel Astor this morning with a large attendance. At the alumnae dinner last night, 40 were present.



O. P. BRIGGS,
Retiring President of the National Founders' Association

METAL MARKETS

New York

Nov. 18.

Copper.—There have been some sales of electrolytic for European delivery during the past few days at 15.25c to 15.50c, c. i. f. There has been a little domestic buying but not enough to permit the market to be regarded as having become firmly settled at the new price level. Practically all the leading producers and selling agencies are offering electrolytic over the next few months at 15.25c to 15.50c, delivered, 30 days, and it would not be surprising if these interests offer further concessions. Second hands do not appear as yet to have found their bearings in the new market. Producers are offering the usual grades of casting copper at 15c to 15.25c, delivered, 30 days, but demand is almost negligible. There appears to be more casting available than usual. There appears to be absolutely no lake copper selling and it is impossible to indicate the market price, even nominally. The two leading lake producers are reported to have some copper on hand, but they have not disposed of any recently. It is expected that a price will be announced shortly.

Standard copper advanced on the London exchange today and reached the highest level in more than a week. The close today was £69 10s for spot and £67 for three months, compared with £68 7s 6d for spot and £68 for three months a week ago. Since last Wednesday the volume of sales of standard on the London exchange has been comparatively small. Copper exports so far this month amount to 16,985 tons. Stocks of standard copper in Europe during the past two weeks, are reported to have decreased 1,400 tons, net. This is about equal to the amount of standard which has been received from Europe by this country for refining.

Tin.—While the general tendency in the tin market abroad last week was toward a lower price level, operations in the domestic market brought about a net advance here. The indication of strength here was due to efforts which were made to concentrate spot supplies. Of actual selling to consumers there was not a great volume. Today the domestic market is quiet but strong. The price of spot, November and December is about 40.25c. Consumption in this country continues to fall off. On the London exchange today there was an advance in the price of spot tin of £1 15s. Today's close was £181 15s for spot and £183 for three months, compared with £179 for spot and £180 5s for three months a week ago. The volume of selling on the London exchange has fallen off greatly the last week. Today only 70 tons of spot and 170 tons of three months were sold. Tin arrivals in this country so far this month total 1,427 tons, while 2,445 tons are still afloat. Of the latter, all but 250 tons is expected to arrive this month.

Antimony.—The antimony market continues sluggish, with a tendency to weakness. Little interest is manifested by consumers. Prices, duty paid, New York, are as follows: Cookson's 7.60c to 7.70c; Hallett's 7.25c to 7.37½c; other brands 6.30c to 6.50c.

Chicago

Nov. 17.

New Metals.—There is comparatively little change in the new metal situation. Selling agencies are competing in the copper market with the result that a weak tone is evident and quotations have been shaded about ½ cent a pound. The demand for spelter is limited.

We quote dealers' selling prices, f. o. b. Chicago, as follows:

Lake copper, carload lots, 16½c; casting, 15¾c; smaller lots, ¼c to ¾c higher. Spelter, car lots, 5.25c; lead, desilverized, 4.25c; sheet zinc, $7.50, f. o. b. La Salle, in car lots of 600-pound casks; pig tin, 40½c; Cookson's antimony, 8½c; other grades, 7½c.

Old Metals. — Dealers are selling freely which would justify the conclusion that they have little confidence in a maintenance of prices. The general slowing down of business is having an effect on the old metal market and a dull heavy tone is evident. Prices in general are somewhat weaker.

We quote dealers' selling prices f. o. b. Chicago as follows:

Copper wire, crucible shapes, 14½c; copper bottoms, 12¼c; heavy red brass, 13¼c; heavy yellow brass, 8½c; No. 1 red brass borings, 11½c; No. 1 yellow brass borings, 8c; brass clippings, 9½c; lead pipe, 4c; zinc scrap, 3¾c; tea lead, 4c; No. 1 aluminum, 16½c; No. 1 pewter, 28c; block tin pipe, 36½c; tin foil, 31½c; linotype dross, 3c; electrotype dross, 3c; stereotype plates, 4½c; stereotype dross, 3c.

IRON AND STEEL PRICES

Pig Iron

PITTSBURGH

(Through This Year.)

Bessemer	$16.15
Basic	14.15
No. 2 foundry	14.65 to 14.90
Malleable	14.90 to 15.15
Gray forge	14.40

(The freight from valley points is 90c.)

CLEVELAND

(Through This Year Delivered in City.)

No. 1 foundry	$15.00
No. 2 foundry	$15.00
No. 2 southern	15.35
Bessemer	16.15
Silveries, 8 per cent silicon	18.55

CINCINNATI

(Fourth and First Quarters.)

Southern foundry No. 1	$14.25 to 14.75
Southern foundry No. 2	13.75 to 14.25
Southern foundry No. 3	13.25 to 13.75
Southern foundry No. 4	13.00 to 13.50
Southern gray forge	12.75 to 13.25
Mottled	12.75 to 13.25
Southern No. 1 soft	14.50 to 15.00
Southern No. 2 soft	14.00 to 14.50
Standard southern car wheels	27.25 to 27.75
Southern Ohio No. 2	14.70 to 15.20
Southern Ohio No. 3	14.20 to 14.70
Southern Ohio No. 4	13.95 to 14.45
Silveries, 8 per cent silicon	18.20 to 18.70

(Freight from Ironton, $1.20; from Birmingham, $3.25.)

CHICAGO

(Delivered Chicago, until July 1, 1914, except northern foundry and malleable Bessemer, which are quoted f. o. b. local furnace.)

Lake Superior char., No. 1 to 4	$15.50
Northern foundry No. 2	15.00
Southern foundry No. 2	15.35
Jackson Co. silveries, 8 per cent	19.40
South n silveries, 5 per cent sil.	16.85
Alabama basic	15.35
Malleable	15.00

PHILADELPHIA

(Prompt and third quarter shipment delivered to consumers' plants, in Philadelphia and vicinity, unless otherwise specified.)

Northern No. 1X foundry	$15.75 to 16.00
Northern No. 2X foundry	15.50 to 15.75
Northern No. 2 plain	15.25 to 15.50
Standard forge (Eastern Pa.)	14.75 to 15.00
Virginia No. 2X	15.80
Southern No. 2	15.00 to 15.50
Standard low phos., Phila.	21.50 to 22.00
Lebanon low phos., furnace	17.50 to 18.00
Malleable	16.25 to 16.50
Basic (Eastern and Central Pa.)	15.00 to 15.25
Middlesbrough, English No. 3 (on docks)	14.25 to 14.50

NEW YORK

(Prompt and third quarter delivery, prices based at Jersey City and tidewater.)

Northern No. 1X foundry	$15.75 to 16.00
Northern No. 2X foundry	15.25 to 15.75
Northern No. 2 plain	15.00 to 15.25
Virginia No. 2X	16.10
Southern No. 2	15.25 to 15.75
Malleable	15.75 to 16.00
Gray forge	14.75 to 15.00

ST. LOUIS

(Throughout This Year.)

Southern No. 1	$15.75 to 16.25
Southern No. 2	15.25 to 15.75
Southern No. 3	14.75 to 15.25
Southern No. 4	14.25 to 14.75

(Freight, Birmingham to St. Louis, $3.75.)

BIRMINGHAM

(For Southern Delivery.)

No. 1 foundry	$12.00 to 12.50
No. 2 foundry	11.50 to 12.00
No. 3 foundry	11.25 to 11.75
No. 4 foundry	11.00 to 11.50
Gray forge	11.00 to 11.50
Mottled	10.25
Standard basic	11.50
Off basic	11.00
Charcoal	25.00

BUFFALO

(Through this year and first quarter of 1914, delivered in city.)

No. 1 foundry	$14.00 to 14.50
No. 2X foundry	13.75 to 14.00
No. 2 plain	13.50 to 13.75
No. 3 foundry	13.25 to 13.50
Gray forge	13.50
Malleable	14.00
Basic	14.25 to 14.50
Charcoal	15.50 to 16.50
Charcoal (special brands)	17.00 to 19.50

Ferro Alloys

English and German 80 per cent ferro manganese, prompt and forward delivery, $49 to $50, seaboard.

Fifty per cent ferro-silicon on contracts, $75, Pittsburgh, or Philadelphia, for carloads; $74 for larger lots and $73 for 600 tons or more. Twelve to 13 per cent, $24. Eleven to 12 per cent, $23. Ten to 11 per cent, $22. Nine to 10 per cent. $21, f. o. b. Globe, Jisco, and Ashland furnace. Freight to Pittsburgh, $1.90.

Ferro-carbon titanium 8 cents per pound for carload lots; 10 cents per pound for 2,000-pound lots and over; 12¼ cents per pound in lots up to 2,000 pounds.

Freight rates on ferro-manganese, foreign spiegeleisen and electrolytic ferro-silicon from Baltimore to Pittsburgh, $2.16; to Youngstown, $2.48; to Cleveland, $2.57; to Detroit and Columbus, $2.99; to Cincinnati, $3.40; to Chicago and Milwaukee, $4.00. Freights from Philadelphia and New York, 10 to 30 cents higher, respectively.

Freight Rates, Finished Material

From Pittsburgh, carloads, per 100 pounds, to:—

New York	16 cents
Philadelphia	15 cents
Boston	18 cents
Buffalo	11 cents
Cleveland	10 cents
Cincinnati	15 cents
Chicago	18 cents
Denver	84½ cents
St. Louis	22½ cents
New Orleans	30 cents
Birmingham	45 cents
Pacific coast, shapes and plates	80 cents

Coke

AT THE OVENS.

	Prompt shipment.	Contract.
Connellsville district:		
Foundry coke	$2.50 to 2.75	$2.50 to 2.75
Furnace coke	1.85 to 1.95	1.85 to 2.15
Wise county district:—		
Foundry coke	$2.65 to 3.10	$2.65 to 3.10
Furnace coke	2.10 to 2.25	2.25 to 2.50
Pocahontas district:—		
Foundry coke	$2.60 to 3.00	$2.60 to 3.00
Furnace coke	2.10 to 2.40	2.20 to 2.75
New River district:—		
Foundry coke	$3.00 to 3.50	$3.00 to 3.50
Furnace coke	2.50 to 2.75	2.50 to 2.75

Iron Ore

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, prices are: Old range Bessemer, $4.40; Mesabi Bessemer, $4.15; old range non-Bessemer, $3.60; Mesabi non-Bessemer, $3.40; all at lower lake ports.

Foreign iron ores, 7½ to 8 cents per unit, f. o. b. cars eastern seaboard. Freight rates from Philadelphia to eastern Pennsylvania furnace points range from 35 to 75 cents per ton.

Semi-Finished Material

PITTSBURGH

Bessemer 4 x 4 billets with 0.25 carbon and less, $21; open-hearth rolling billets, $21; Bessemer sheet bars, $22; open-hearth sheet bars, $22, f. o. b. Pittsburgh and Youngstown. Forging billets, $26, Pittsburgh. Wire rods, $26 to $27; muck bar, $30, Pittsburgh.

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: 4 x 4-inch open-hearth and Bessemer, rolling billets at $24.00 to $25.00, and foreign billets at from $29.00 to $30.00; muck bar, $28.00 to $30.00.

Standard Shapes

PITTSBURGH

Standard structural shapes, 1.30c to 1.35c. For extras see card of Sept. 1, 1909.

CHICAGO

Standard structural shapes, 15 inch and under, 1.48c.

PHILADELPHIA

Standard structural shapes, base sizes, delivered to consumers' plants in Philadelphia and vicinity, 1.40c 1.45c.

NEW YORK

Standard structural shapes, base sizes, delivered in metropolitan district, 1.41c to 1.46c.

Plates

PITTSBURGH

Standard steel plates ¼ inch thick, 6¾ to 100 inches, 1.25c to 1.30c. For extras, see card of Sept. 1, 1909.

CHICAGO

Tank plates, 1¼ inches thick, 6⅝ to 100 inches wide, 1.43c to 1.48c.

PHILADELPHIA

Tank plates, base sizes delivered to consumers' plants in Philadelphia and vicinity, 1.40c to 1.45c.

NEW YORK

Tank plates, base sizes, delivered in the metropolitan district, 1.41c to 1.46c.

Sheets and Tin Plate

PITTSBURCH

No. 28 black	1.95c to 2.00c
No. 28 tin mill black	1.90c to 2.00c
No. 28 galvanized	2.95c to 3.00c
No. 10 blue annealed	1.45c to 1.50c
No. 28 painted corrugated	2.15c to 2.20c
No. 28 galvanized corrugated	3.05c to 3.10c
Tin plate, 100-pound cokes	3.40c

PHILADELPHIA

Delivered to consumers' plants in Philadelphia and vicinity: No. 10 gage annealed sheets at 1.60c to 1.65c.

Pipe and Boiler Tubes

PITTSBURGH

	Black Butt-Weld.	Galv. Weld.
Steel, ¾ to 3 inches	80	71½
Iron, ¾ to 2½ inches	70	61
	Lap-Weld.	
Steel, 2½ to 6 inches	79	70½

BOILER TUBES

Steel, 3½ to 4½ inches	69	..
Iron, 3½ to 4½ inches	58	..

Other sizes of pipe and tubes take the usual advances as per official cards.

Rails and Track Material

PITTSBURGH

Steel rails, 50-pound and heavier, 1.25c per pound for Bessemer and 1.35c for open-hearth, carload lots; less than 500 tons, 1.35c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c base, Pittsburgh; track bolts, 2.25c base, Pittsburgh.

Railroad spikes, 4½, 5 and 5½ and 9-16 inch, 1.55c to 1.60c.

CHICAGO

Light rails, carloads, 25 to 45-pound, 1.25c, base; 16 to 20-pound, 1.30c; 12-pound, 1.35c; 8-pound, 1.40c.

Light section relayers, 45 pounds and under, subject to inspection, $21.50 to $22.50; standard section relaying rails, subject to inspection, $23 to $24.

Track fastenings, f. o. b. Joliet:

Angle bars, 1.50c; railroad spikes, 1.65c to 1.70c; smaller size spikes, 1.85c base; track bolts with square nuts, 2.10c to 2.20c.

Bars, Hoops and Bands

PITTSBURGH

Common iron bars, 1.45c, Pittsburgh; Bessemer and open-hearth steel bars, 1.30c to 1.35c; plow and cultivator, 1.30c to 1.35c; channels, angles, zees, tees, under 3 inch, 1.40c to 1.45c, all f. o. b. mill.

Hoops, in carload lots, 1.50c, Pittsburgh; in less than carload lots, 1.55c; bands, 1.30c to 1.35c base, with net extras as per standard steel.

Cold rolled and ground shafting, 62 to 63 per cent off in carloads and 57 to 58 per cent in less than carloads delivered in base territory.

CHICACO

Bar iron, 1.15c to 1.20c; hard steel bars rerolled, 1.40c; soft steel bars, bands and small shapes, 1.48c to 1.53c; hoops, 1.53c; smooth finished machinery steel, 1 inch and larger, 1.73c; shafting, 60 per cent off list for carload lots, 55 per cent off for less than carloads.

PHILADELPHIA

Delivered in consumers' plants in Philadelphia and vicinity: Steel bars, 1.55c to 1.60c on contract and common bar iron, 1.27½c to 1.37½c. Cut nails 1.80c to 1.90c, Philadelphia. Shafting 62 and 60 off in carloads and 57 and 55 off in less than carloads in base territory.

NEW YORK

Soft steel bars delivered in the metropolitan district, 1.56c; common iron bars, 1.30c to 1.40c.

Bolts, Nuts and Rivets

Rivets

Button head structural rivets, 1.80c to 1.85c, Pittsburgh; cone head boiler rivets, 1.90c to 1.95c. Small rivets, 80 and 10.

Structural rivets, Chicago, 1.90c; boiler rivets, 0.10c extra.

Bolt and Nut Discounts

(Delivered within 20-cent freight radius.)

Carriage bolts, ⅜ x 6 inches, small and shorter, rolled threads, 80 and 2½; cut threads, 75 and 17½; larger and longer, 70 and 15.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled 80 and 7½; cut, 80 and 2½; larger and longer, 70, 10 and 10.

Gimlet and cone point lag or coach screws, 80 and 20.

Hot pressed square, blank or tapped nuts, $6.00 off list; hot pressed hexagon blank or tapped, $6.70.

Cold pressed C. & T. square, blank, or tapped, $3.80 off; hexagon, blank or tapped, ⅝ inch and larger, $6.80 off; ½-inch and smaller, $7.40.

Wire Products

PITTSBURGH

Wire nails, jobbers' carload lots, $1.60; retailers' carload lots, $1.65; cut nails (western makers), jobbers' lot, $1.65; painted barb wire, jobbers' carload lots, $1.65; retailers' carload lots, $1.60; plain wire to jobbers in carloads, $1.40; and to dealers in carloads, $1.45; polished staples, $1.60; galvanized staples, $2.00.

CHICAGO

Wire nails, jobbers' carload lots, $1.78; retailers' carload lots, $1.83; retailers' less than carload lots, $1.88; painted barb wire, jobbers' carload lots, $1.78; retailers' carload lots, $1.83; retailers' less than carload lots, $1.88, with 40c for galvanizing; plain wire, jobbers' carload lots, $1.58; retailers' carload lots, $1.63.

Cast Iron Pipe

CHICAGO

Four-inch water pipe, $27; 6 to 12 inches, $26; larger sizes, $24; gas pipe, $1 a ton higher.

NEW YORK

Six-inch pipe, 30 pounds to the foot, $23 to $24, f. o. b. New York, in carload lots.

BIRMINGHAM

Water mains, 4-inch, $2.50; 6-inch and up, $19.50. Gas main: $1 per ton higher than water main. Special fittings, $47.50 to $52.50.

Old Material

PITTSBURGH

(Gross Tons Delivered.)

Heavy melting scrap	$11.50 to 11.75
Rerolling rails	13.50 to 14.00
Malleable	10.50 to 10.75
Bundled sheet scrap	6.50 to 7.00
Iron axles	23.00 to 23.50
Old iron rails	13.50 to 14.00
Stove plate	8.50 to 9.00
No. 1 wrought scrap	12.00 to 12.50
Old car wheels	11.50 to 12.00
Low phosphorus	14.00 to 14.25
Machine shop turnings	6.75 to 7.00
No. 1 busheling	9.25 to 9.50
Cast borings	7.00 to 7.50
No. 1 cast scrap	11.50 to 12.00

PHILADELPHIA

Gross tons delivered to consumers' plants, in eastern Pennsylvania and western New Jersey:

Old iron rails (nominal)	$16.00 to 16.50
Old steel rails (reroiling)	12.75 to 13.25
No. 1 heavy melting steel	10.25 to 10.75
Old car wheels	12.25 to 12.75
Old iron axles (nominal)	22.00 to 23.00
Old steel axles	16.00 to 16.50
No. 1 railroad wrought	13.50 to 14.00
Wrought pipe	9.50 to 10.00
Cast borings	7.50 to 7.75
Machine shop turnings	7.00 to 7.50
Heavy cast (broken)	13.00 to 13.50
Malleable	11.00 to 11.50
Stove plate	9.00 to 9.50
No. 1 forge	8.00 to 8.50
Low phosphorus	14.50 to 15.00

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J.; $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg, and Steelton, Pa.; $1.40 to Milton, Pa.

CLEVELAND

Gross Tons

Old iron rails	$12.50
Old steel rails (under 3 ft.)	12.00 to 12.50
Old steel rails (over 6 ft.)	11.50 to 12.00
Relaying rails	23.00 to 25.00
Old steel boiler plate	8.00 to 8.50
Malleable iron (railroad)	11.00 to 11.50
Axle turnings	6.00 to 6.50
Steel axles	16.50 to 17.00
Malleable iron (agricultural)	8.50 to 9.00
Heavy steel	9.50 to 9.75
Country mixed steel	8.00 to 8.50
Bundled sheet scrap	6.50 to 7.00

Net Tons

No. 1 R. R. wrought	$10.50 to 11.00
No. 1 busheling (nominal)	8.50 to 9.00
No. 1 machine cast	10.50 to 11.00
No. 1 dealers' wrought	8.00 to 8.50
Machine shop turnings	4.00 to 4.50
Pipes and flues	7.00 to 7.50
Wrought drillings	4.00 to 4.50
Cast borings	5.00 to 5.50
Stove plate	8.00 to 8.25
Wrought iron arch bars (nom.)	13.00
Wrought iron piling plate (nom.)	13.00

CHICAGO

(Delivered in consumers' yards.)

Gross Tons

Old car wheels	$11.50 to 12.00
Rerolling rails (5 ft. and over)	12.00 to 12.50
Old steel rails (3 ft. and und.)	11.00 to 11.50
Frogs, switches and guards	9.00 to 9.50
Heavy melting steel	9.00 to 9.50
Shoveling steel	8.00 to 8.50

Net Tons

No. 1 R. R. wrought	$8.75 to 9.25
No. 2 R. R. wrought	7.75 to 8.25
Arch bars and transoms	12.50 to 13.00
Knuckles, couplers and springs	9.00 to 9.50
Shafting	13.00 to 13.50
Iron car axles	20.00 to 20.50
Steel car axles	12.50 to 13.00
Locomotive tires	10.50 to 11.00
Dealers' forge	8.25 to 8.75
Pipe and flues	6.75 to 7.25
No. 1 cast	10.00 to 10.50
No. 1 busheling	7.75 to 8.25
No. 2 busheling	6.00 to 6.50
No. 1 boiler cut	7.00 to 7.50
Boiler punchings	10.25 to 10.75
Cast borings	4.50 to 5.00
Machine shop turnings	4.25 to 4.75
Agricultural malleable	8.50 to 9.00
Railroad malleable	9.00 to 9.50
Angle bars, splices, etc., iron	12.50 to 13.00
Angle bars, steel	8.50 to 9.00
Stove plate and light cast scrap	8.75 to 9.25

NEW YORK

Gross tons, New York dealers' prices at tidewater, usually for eastern Pennsylvania delivery:

Old car wheels (nominal)	$10.50 to 11.00
Heavy steel axles	15.25 to 15.50
Steel shafting	13.00 to 13.25
No. 1 heavy melting steel	8.25 to 8.50
No. 1 R. R. wrought	11.00 to 11.50
Wrought pipe (not galvanized)	7.00 to 7.25
Cast borings	5.25 to 5.50
Machine shop turnings (nominal)	5.25 to 5.50
Heavy cast	10.00 to 10.50

Stove plate	7.50 to 8.00
Grate bars	6.50 to 7.00

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixville, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York.

CINCINNATI

Gross Tons

Old iron rails	$11.00 to 11.50
Old steel re-rolling	9.50 to 10.00
Old iron axles	15.50 to 16.00
Heavy melting scrap	8.50 to 9.00
Relaying rails	18.50 to 19.00

Net Tons

Old No. 1 R. R. wrought	$ 8.50 to 9.00
Bundled sheet scrap	4.50 to 5.00
No. 1 yard wrought	6.50 to 7.00
No. 1 machine cast	8.50 to 9.00
No. 1 busheling	6.00 to 6.50
Stove plate	6.25 to 6.75
Machine shop turnings	4.00 to 4.50
Cast borings	4.00 to 5.00
Heavy turnings	5.00 to 5.50
Mixed cast	7.50 to 8.00
Breakage	5.00 to 6.00
Malleable	6.50 to 7.00

BIRMINGHAM

Old iron axles (light)	$15.00 to 15.50
Old steel axles (light)	15.00 to 15.50
Old iron rails	12.50 to 13.50
No. 1 R. R. wrought	12.00 to 12.50
No. 2 R. R. wrought	10.00 to 10.50
No. 1 country wrought	9.50 to 10.00
No. 2 country wrought	8.50 to 9.00
No. 1 machinery cast	10.50 to 11.00
No. 1 steel scrap	10.50 to 11.00
Standard car wheels	12.00 to 12.50
Tram car wheels	10.50 to 11.00
Light cast and stove plate	9.00 to 9.25

BUFFALO

Gross Tons

Heavy melting steel	$ 9.75 to 10.50
No. 1 R. R. and mch. cast scrap	12.00 to 12.50
No. 1 R. R. wrought scrap	12.00 to 12.50
Old steel axles	17.00 to 17.50
Old iron axles	22.50 to 23.00
Car wheels	11.75 to 12.25
Railroad malleable scrap	11.00 to 11.50
Machine turnings	5.00 to 5.50
Heavy axle turnings	8.00 to 8.75
Cast iron borings	5.50 to 6.00
Low phos. steel scrap	16.50 to 17.00
Old iron rails	15.00 to 15.50
Boiler plate sheared	11.50 to 12.00
Bundled sheet scrap	6.50 to 7.00
Stove plate (net ton)	9.75 to 10.00
Locomotive grate bars	9.50 to 10.00
No. 1 busheling scrap	9.00 to 9.50
No. 2 busheling scrap	7.00 to 7.50
Wrought pipe	8.50 to 9.00

ST. LOUIS

(Dealers' buying prices.)

Gross Tons

Old car wheels	$10.25 to 10.75
Old iron rails	11.00 to 11.50
Re-rolling rails (5 ft. and over)	10.50 to 11.00
Old steel rails (3 ft. and und.)	9.00 to 9.50
Light sec. relayers (45 pounds and und.) subject to inspec.	23.00 to 23.50
Relaying rails subject to inspec.	23.00 to 23.50
Frogs, switches and guards	8.50 to 9.00
Shoveling steel	8.00 to 8.50

Net Tons

No. 1 railroad wrought	$ 9.00 to 9.50
No. 2 railroad wrought	8.50 to 9.00
Arch bars and transoms	12.00 to 12.50
Knuckles, couplers, springs	8.00 to 8.50
Shafting	12.50 to 13.00
Steel car axles	14.00 to 14.50
Iron car axles	17.00 to 17.50
Locomotive tires	10.00 to 10.50
Pipe and flues	6.00 to 6.50
Tank iron and cut boilers	6.00 to 6.50
No. 1 cut busheling	8.00 to 8.50
Cast iron borings	3.00 to 3.50
Machine shop turnings	4.00 to 4.50
Railroad malleable	7.50 to 8.00
Agricultural malleable	6.00 to 6.50
Stove plates	7.00 to 7.50
Angle splice bars (iron)	10.00 to 10.50
Angle splice bars (steel)	8.00 to 8.50

Store Prices

CINCINNATI

Steel bars, 1.85c to 2.00c; iron bars, 1.80c to 1.90c; plates and shapes, 1.95c to 2.10c; sheets, blue annealed, No. 10, 2.15c to 2.20c; black No. 28, 2.65c; galvanized, No. 28, 3.75c; cold rolled shafting, round, square, hexagon and flat, 55 to 58 off.

CLEVELAND

Steel bars, 1.85c; plates and shapes, 2.00c; iron bars, 1.85c; sheets, No. 10 blue annealed, 2.15c; No. 28 black, 2.60c; No. 28 galvanized, 3.60c.

CHICAGO

Steel bars, 1.75c; iron bars, 1.75c; hoops, 2.25c; shapes and plates, 1.85c; No. 10 blue annealed sheets, 2.05c, black, No. 28, 2.65c; galvanized, No. 28, 3.65c to 3.70c.

PHILADELPHIA

Steel bars, 1.85c to 1.90c; structural shapes, 1.85c to 1.95c; plates, 1.85c to 1.95c.

NEW YORK

Steel bars, 2.00c; structural shapes, 2.05c; plates, 2.05c.

LOW STOCKS

Are, It Is Believed, Reflected by Hand-to-Mouth Buying.

New York, Nov. 19. (By wire.)—Hand-to-mouth buying generally marks the finished steel situation, and this condition, in the opinion of some leading makers, continues to emphasize low stocks of consumers. The United States Steel Corporation's new business this month is running at just about the level of November. Rail sales of the Corporation of the last ten days were about 60,000 tons, including the Louisville & Nashville order for 45,000 and other scattering orders, most of which were previously reported.

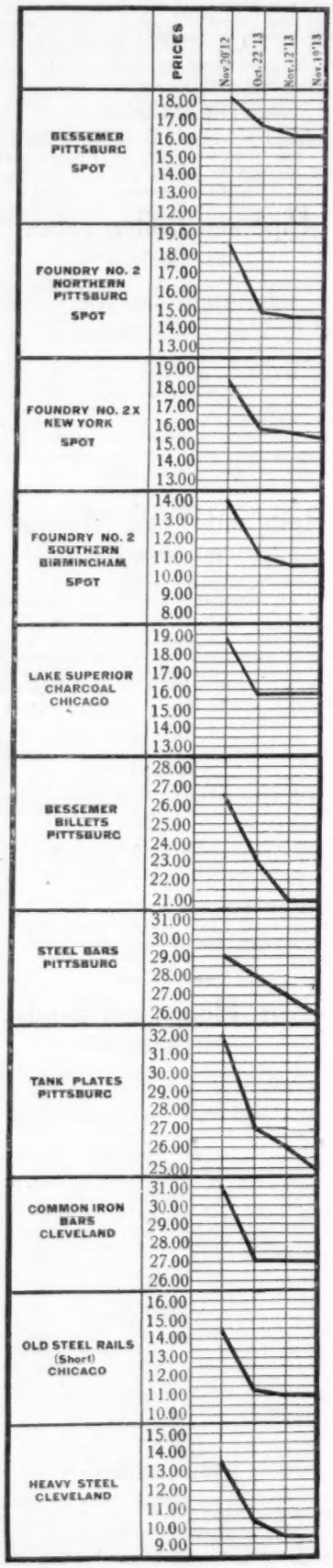
Reports from abroad continue to show stronger conditions in semi-finished steel and wire.

The Wabash is reported to have placed five hundred cars.

Sellers Show Some Back Bone

New York, Nov. 19. (By wire.)—Efforts of large buyers, including the United States Cast Iron Pipe & Foundry Co., to obtain southern iron at a low price are being resisted by some of the most important Alabama producers, and negotiations for round tonnages now hang. Some leading makers continue to express their opinion that market is $11 despite contrary reports. Pipe makers, it is understood, seek to buy below $10 for low grade iron. Final information is yet lacking as to the identity of the maker in the sale of 20,000 tons rumored to have been closed.

PRICE CHART



Use of Electric Power in Foundry Operations

(*Continued from page 924*)

for moving the controller to the third or fourth positions to start and then bringing it back to the first point in order to slow it down after the motor shall have once started.

Both of these slow speed connections give to the series motor somewhat the characteristics of the shunt motor; that is, they tend to run it—and if necessary to develop high torque—without gain in speed as the load is diminished. This is in distinct contrast to the series motor, controlled merely by the insertion of resistance in series with the armature. The value of these speeds which are not only slow but stable, is, of course, apparent in connection with many operations in foundry practice.

The experience of the last few years has clearly illustrated the wisdom of applying magnetic switch controllers to motors on cranes which are subjected to severe service, or on cranes carrying large motors. When magnetic switch controllers are used, the crane man merely operates a small master controller. The main motor currents are automatically controlled by magnetic switches, and no matter how fast or senselessly the craneman moves the master controller, the motor cannot be abused, due to the automatic action of the magnetic switches. At the same time, these magnetic switches automatically perform the operations of starting or reversing in the shortest, safe amount of time. In short, the installation of a magnetic switch controller speeds-up the operation of the crane decidedly, and it protects the motor and the driven machinery from abuse and resulting depreciation charges and delays.

Safety Devices

In response to the demands of the general movement for safety, there are found two important pieces of electrical apparatus which are now being widely installed on electrical traveling cranes. These are the crane switchboard and the safety limit stop.

The crane switchboard had its inception, several years ago, in the discussion and recommended design of the Association of Iron and Steel Electrical Engineers, and its wide adoption has been due largely to the safety features which it provides. It is made up generally of a circuit-breaker switch for disconnecting from the supply lines all the motors on the crane, overload relays for each motor circuit, push buttons for closing or quickly opening the circuit-breaker switch, and a safety plug, the removal of which makes it impossible to close the circuit-breaker switch, and thereby makes all the crane motors inoperative. In case of sudden danger, every motor on the crane can be stopped instantly by pushing the opening button, and by this action disconnecting the motors from their supply of power. As to the safety plug, this is intended to be removed and a lock placed in the front of its socket, by any man repairing or working on the crane, who thus insures that the crane shall not be moved until he has finished his work and has removed his lock and re-inserted the safety plug. The circuit-breaker switch, in connection with the overload relays, also provides overload production and stops the expensive practice of blowing fuses.

Safety Limit Stop

The safety limit stop is designed and used to prevent over-travel of the hook block in the hoisting direction. The more modern devices for accomplishing this purpose are generally operated directly by the hook block itself instead of being geared to the hoisting machinery, and they so operate that they forcibly stop the motor by dynamic braking instead of merely disconnecting the hoist motor from its source of power. Both of these features of operation are warranted by the results obtained, for they lead to absolute sureness of operation and extremely accurate stopping. On any crane the installation of a safety limit stop is worthy of consideration on the grounds of safety and increasing the safe working hoisting distance of the crane.

If there is any one concluding thought which the writer wishes to emphasize, it is his absolute conviction that, from observation of foundry practice as contrasted with, say, steel mill practice or machine shop practice, the foundry has the opportunity to secure material increase in speed of production and decrease in labor cost by the application of electrically-operated machinery.

Personal skill will always be required, but personal skill should be helped and not hampered by the means of manufacture. No outside manufacturers of machinery or electrical devices can solve this problem. Such manufacturers can merely furnish the different units which the foundryman must combine and apply with that degree of restless ingenuity which surely spells progress in any manufacturing art. All these things can be done and can be made to pay. The fact cannot be brushed aside, that in the foundries that are the largest, that are growing the most rapidly and that are making the most money, the use of power-driven, labor-saving machinery is most prevalent.

Annual Statistics of Production

The annual statistical report of the bureau of statistics of the American Iron and Steel Institute, for the year 1912, has just been issued. The volume is compiled by Statistician William G. Gray and assistants and the style long followed by the American Iron and Steel Association in the preparation of its annual reports has been closely adhered to. The volume consists largely of the bulletins which have been issued from time to time by the institute and published in essential parts by THE IRON TRADE REVIEW. A table is given, as usual, showing the percentage of production of the United States Steel Corporation, as follows:

	Per cent. 1912.	1911.
Shipments of iron ore from the Lake Superior region	50.46	54.3
Total production of iron ore	47.92	45.4
Production of coke	38.01	34.1
Spiegeleisen and ferro-manganese	80.82	76.3
Bessemer, basic, low-phosphorus, foundry, forge, ferro-silicon, etc.	47.47	45.2
Total pig iron, including spiegeleisen, ferro-manganese, ferro-silicon, etc.	47.72	45.4
Bessemer, open-hearth, crucible, electric and all other steel ingots and castings	54.08	53.9
Steel rails, including Bessemer, open-hearth, electric, rerolled, renewed, etc.	56.27	56.1
Structural shapes	49.83	47.0
Plates and sheets, including black plates for tinning	50.37	45.7
Wire rods	63.20	64.7
Other finished rolled products, including nail plate, iron rails, merchant bars, rolled forging blooms and billets, semi-finished products rolled for export, etc.	40.56	35.1
Total of the rolled products enumerated above	48.52	45.7
Wire nails	49.30	51.4
Tin plates and terne plates	60.37	60.7

Buying Machinery.—The General Electric Co., Schenectady, N. Y., has closed for a considerable quantity of machinery during the past few weeks. This included one 7-foot radial drill, some sensitive drills, a planer, a shaper, some milling machines and other tools. It still has out several small lists on which it has not yet taken action, notably one which was issued on Oct. 30, and involves 15 or 16 machine tools.

The Central Foundry Co., 33 Cummings street, Roxbury, Mass., has taken out a building permit for the erection of a frame storage building.

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Let the Suit Go On

The petitions which were recently signed by thousands of the employes of the United States Steel Corporation, praying that the government dismiss the dissolution suit, must have given rise to a feeling of deep satisfaction on the part of those who have directed the Corporation's policies since the time of its organization.

The lot of steel workers in this country has indeed been improved vastly since 1901, and in the work of general uplift the Steel Corporation has been the leader. These petitions were of unusual significance as being indicative of the loyalty of the Corporation's employes. They showed that the workmen are cognizant of the benefits they enjoy under present conditions. That the petitions will be granted, however, seems highly improbable. The administration at Washington will probably not seriously entertain the proposition.

Nor is it likely that the Corporation officials and stockholders would care to see such action taken. The present suit is the natural outcome of long continued discussion and debate as to the status of the Steel Corporation under the Sherman law. Those who have in their hands the guidance of the iron and steel industry in this country realize that the decision, whatever it will be, is necessary to the industry. The dissolution suit is an issue of grave importance. Till the final adjudication is brought about, "big business" will remain in doubt as to just how far and to what extent the laws of this country permit the accumulation of capitalization, the consolidation of enterprises of a similar nature, and co-operation on the part of competitors. The suit must go on in order that these questions be settled for all time. And the sooner the final decision is handed down, the better it will be for the entire country in general and the iron and steel industry in particular.

Still Falling by the Wayside

If there are any who think the American iron and steel industry is now so modernized that all the plants can operate at a profit in moderately good times, a careful study of data given in the trade's annual statistical report, just issued, will quickly convince them of their error. Throughout all the history of the industry, plants have fallen by the wayside, blast furnaces, rolling mills and steel works. The common history of such a derelict is that at first it ran always, in good times or bad. Next it dropped out in severe depressions. Later it required only a mild depression to put it out. Then, perhaps it would run only for a spell in boom times. Eventually there came a time when it went out of operation permanently; no trade revival was sufficient to resuscitate it.

Times really have not changed. There are still many such plants. Certainly the iron and steel industry enjoyed good times in 1912. It is possible that in exceptional cases there may have been plants which were idle in 1912, though capable normally of making a profit, but in general any plant which did not produce a ton during 1912 is a plant which is out of the running; it has fallen by the wayside.

That there are many such is shown by the compilations in the annual statistical report of the Bureau of Statistics of the American Iron and Steel Institute, given to the public in the past few days. At the close of 1911, there were 465 completed blast furnaces, and at the close of 1912 there were 466, or one more. These are furnaces, the owners of which claimed they were not abandoned, but the number of furnaces actually in blast during any part of the first half of 1912 was only 302, the number in the second half being 337. The rated capacity of the 466 furnaces is given at 43,257,000 tons, but the year's actual production was only 29,726,937 tons, showing a deficiency of 13,530,063 tons, or more than 31 per cent. And lest one conclude that possibly the non-productive furnaces were in districts which have been written out by the general march of events it must be mentioned that the tabular statement, by states, shows a fairly even distribution of the idleness throughout all districts.

With steel works we have the same story. There were 182 open-hearth steel plants in 1912, but 25 of them, or 14 per cent, did not produce at any time in the year. There were 98 Bessemer steel plants, but 15 of them, or 15 per cent, did not operate. There were 127 crucible, electric and miscellaneous steel plants, but 15 of them, or 12 per cent of them, did not operate.

Passing to rolling mills, we have the same condition.

There were 445 rolling mills equipped with hot trains (the Bureau's activities do not take cognizance of plants which merely cold-roll material), but 72 of these, or 16 per cent, produced nothing in 1912.

Unless we soon have a period of still greater prosperity than that of 1912, it is certain that practically none of the blast furnaces, steel works and rolling mills which did not operate at any time in 1912 will ever again be operated. The majority of plants which are operating are improving their facilities, increasing their economies and fortifying themselves, while those that are idle are standing still while the procession goes by.

But this is not all of the story. The time was that the majority of these idle plants flourished. Probably there are plants now flourishing which in time will become dead timber. The plant which does not make improvements must fall behind. Those improvements are costly; it is not a matter of brains alone, it is also a matter of money. There are some politicians and pseudo economists who do not think that those improvements should be paid for out of earnings. Whence the money should come, they do not trouble to tell us, but if the money must come, and does not come from within, then it must come from without. The country must have its steel industry, and if individual steel makers are not permitted to make enough money to stay in business, then it follows that to maintain the industry it is necessary for men to make money in boots and shoes, or what not, invest it in steel-making plant, make steel, run the course, abandon the plant and die in poverty, happy that he has served his country. But if all industry were conducted along the same lines, how could the one feed upon the other?

Cutting Costs and Tonnage

Duplexing steel operations which have been conducted on a large scale by some of the leading works now are temporarily passing in the eastern district. This is the usual result of a condition of trade such as at present exists in the steel industry.

The duplexing method, as has been pointed out repeatedly, is not a cheap one. Its advantages are not those of cost, but of output, with the further feature that some steel-making equipment, which otherwise might be used only in limited way or not at all, is put to good economic purpose. The increased tonnage that is obtained from the hooking up of the open-hearth furnaces and the Bessemer converters in one process, over that which the same equipment could produce, when working independently, is the great compensating advantage of the duplex method.

The passing of duplexing temporarily in the east at this time, results from two main causes. The first of these is that the smaller market for steel products renders unnecessary a maximum ingot output. The second cause, which probably is the most important, in view of falling prices for finished materials and the necessity laid upon makers to reduce their costs in whatever way possible, arises from the present divergence of value in basic pig iron and heavy melting steel scrap. Basic iron, delivered in eastern Pennsylvania, is quoted at present at about $15, delivered. Heavy melting steel in the same territory is $10.50, delivered. The economies that are possible through a switch from the duplexing or all-pig method back to the pig and scrap process, where the percentage of the latter material may be varied widely, are manifest.

The suspension of duplexing will mean a considerable contraction of the total output of steel in the eastern industry and will enable makers to adjust their operations without adding the increased cost that usually comes with lightened production.

Another Link in the Endless Chain

The award of the board of arbitration in the wage controversy between eastern railroads and their conductors and trainmen, giving the employes an increase in wages of 7.3 per cent, or $6,000,000 per annum is, like most awards of this kind, a compromise, but the railroads won on all of their contentions except that of increase of cost of living, on which the award states that the arbitrators find that there has been a substantial increase since the adjustment of 1910, but the board does not found its action entirely on the increased cost of living. If it does not base its advance in wages on the increased cost of living, the award is not clear as to what the basis is. The claims of standardization, increased risk, increased productivity of the train crew, and the claim that profits made by the railroads in recent years have increased out of proportion to wages, the board finds are not sustained.

W. W. Atterbury, vice president of the Pennsylvania railroad, and A. H. Smith, senior vice president of the New York Central, have filed a dissenting opinion, in which they give their reasons for not being able to sign the report. On most of the points, the dissenting opinion does not differ greatly from that of the majority, although it manifests less patience with some of the contentions of the employes. On the matter of increased cost of living, the dissenters assert that such increased cost as has occurred is not sufficient to justify the increase granted.

Representatives of the railroads assert that this award, further widening the disparity between trainmen's wages and those in other lines, "adding to wages already unduly high, make equitable treatment of employes difficult, if not impossible". They fear the results of this arbitration cannot but further encourage that continual round of wage demands upon railways, which regularly involve strike votes, public anxiety, mediation, arbitration and compromise. "It is," say Messrs. Atterbury and Smith, "most unfortunate that the railways should be compelled to divert further sums from the essential investments—improved signals, elimination of grade crossings, heavier track and bridge structures, steel cars and other improvements absolutely necessary for the highest state of safe operation." It has indeed been an endless chain process and the public at large naturally begins to wonder when it will stop. If wages are to be continually raised, freight rates must be, and the consumer finally foots the bill. Who will raise his wages? Will that be done by government officials also? If so, where is the process to end? If we are to have more and more government supervision, more and more the greatest wisdom will be required in delicately and justly determining the rights of all parties concerned.

Improvement in Trade Conditions

Due to Influence of Steel Corporation—Men More Friendly and Truthful—Hearings in Dissolution Suit Continued in New York

The United States Steel Corporation dissolution suit hearings continued in New York all of last week and the outlook is that they will go on in that city and will not be held in other cities for some time, if at all. The testimony taken last week concerned competition between the various steel makers, the making of contracts for delivery of steel products over a long period of time, and the general improvement in feeling which obtains among competitors in the steel casting business. On the latter subject, C. C. Smith, president of the Union Steel Casting Co., Pittsburgh, submitted some interesting testimony.

Mr. Smith said he has been connected with the steel casting business continuously since 1883. Under David A. Reed's questioning, he first testified that as a large buyer of scrap he has found no indications of any combinations to control prices on scrap. He also testified regarding the effects of the Corporation's policies as they were felt in the steel casting business. He said that before the formation of the Steel Corporation business ethics were bad. Competitors had no confidence in each other, he said, and the same lack of confidence existed between sellers and purchasers.

Competitors Have Quit Lying

"For the past seven or eight years, however," said Mr. Smith, "this lack of confidence has been done away with. Competitors have quit lying to each other and dealings between sellers and buyers are conducted on a manly, straightforward basis. The Corporation has been responsible for this new condition. As an illustration of the feeling that exists between competitors at present, we were having some trouble some time ago with locomotive wheels. Hard spots appeared in the castings. I went up to Buffalo to Pratt & Letchworth, and they showed me what to do to overcome the trouble. At the same time they told me they were unable to get as good a finish on their castings as we did. So I spent a half day showing them how to improve their finish. This exchange of information would have been impossible 15 years ago."

"You say you quit lying to each other in the steel casting business," said Judge Dickinson, of government counsel, in cross-examination. "When did you quit lying?"

"I don't like that word you use," objected Mr. Smith.

"Well, I took the word right out of your mouth," continued the attorney. "Now tell me when you quit lying."

"We used to deliberately misrepresent things to each other."

"Then when did you quit misrepresenting things to each other?"

"I couldn't say exactly when. There was a foundrymen's meeting in 1902 which paved the way for a better understanding among the steel casting people," said Mr. Smith.

"So the lying tapered off gradually?" asked the attorney.

"Yes."

Asked Percentage of Untruth

"Now give the percentage of lying for each year, beginning with 1902, so we can tell just how it fell off and how this spiritual renovation was brought about. Of course, I suppose there were no sudden conversions like that of Saul on his way to Tarsus."

"No, it was a gradual change, and I could not tell you just how it progressed from year to year. Even at present there are some competitors we cannot believe."

"Very well," said the attorney. "Now, what I want to get at is just what the Steel Corporation did that brought about this moral uplift among the steel casting makers?"

"The Steel Corporation," said Mr. Smith, "as the leader of the large manufacturers, brought about a better feeling among the large manufacturers and this extended to us."

"Can you name any one thing the Steel Corporation did to bring about a better feeling among competitors in the steel casting industry?"

"No, I cannot state anything definitely."

"That's all," said the attorney, and Mr. Smith was excused.

John L. Haines, assistant to the vice president, Jones & Laughlin Steel Co., Pittsburgh, enumerated the products manufactured by his company. These, he said, it sells in active competition with other steel makers. Since 1899, when he first became familiar with the selling end of the business, said Mr. Haines, there has been competition; since 1904, however, the competition has been much more active than it was as a rule from 1899 to 1904. He said trade paper quotations are fairly representative of the market. At all times, however, he said, it is possible that certain transactions may have occurred which were not known to "the parties putting the information before the public". Asked if contracts are ever made at prices lower than the trade paper quotations, Mr. Haines admitted that there are.

Robert Garland, president of the Garland Nut & Rivet Co., Pittsburgh, said his company buys steel bars, wire rods, etc., and there is active competition on the part of the makers. Mr. Garland said it is generally possible to obtain lower prices on contracts than is indicated in trade papers.

Frederick N. Beegle, president of the Union Drawn Steel Co., Beaver Falls, Pa., said his company buys 100,000 tons of bar mill products a year. Asked if any other concern in the country buys as large a quantity of bar mill products as this, he said he did not know of any. He testified that he finds competition in the sale of bar mill products keen. Mr. Beegle said that he generally reads The Daily Iron Trade for his market information. He said he is generally able to buy his raw materials at lower prices than generally indicated in the trade papers. There are times, he said, when he has to pay the prices set forth in the trade papers, but this is more the exception than the rule.

Louis C. McKinney, president of the Titusville Iron Co., Titusville, Pa., maker of boilers and oil well machinery, a buyer of boiler plate and boiler tubes, said that in the sale of plates and tubes there is a great deal of competition on the part of makers. Prices quoted on these products vary from $1 to $3 a ton. There is never any indication of the existence of price agreements.

Variation of Prices Shown

Glenn C. Lott, general manager of the Struthers-Wells Co., Warren, Pa., was called to the stand to submit copies of a number of contracts which he had made with various steel makers for raw material for his company. These covered the period from 1904 to the present time. The commodities embraced steel plates, bars and shapes, sheets, etc. The object of entering this evidence was two-fold. In the first place it was shown that, with scarcely any exceptions, the prices named in the contracts were lower than the prices which were set forth contemporaneously in the trade

papers. In the second place, the contracts showed that prices varied as quoted by different steel makers, thus indicating that there was active competition.

Joseph F. Guffey, general manager of the Philadelphia Co., Pittsburgh, was a witness on Thursday. He testified that the Philadelphia Co. controls traction lines, natural gas and electric systems and other public utilities in and around Pittsburgh. Mr. Guffey said his company is a large buyer of steel pipe and other steel products. During the past 10 or 12 years, it has made annual purchases of pipe ranging from something over 700 tons to 25,000 tons. The purchase of slightly more than 700 tons, he said, was made in the year 1908, following the panic, during which year the Philadelphia Co. did not extend its facilities very much.

Pipe Makers in Competition

His company, said Mr. Guffey, has always made its pipe purchases by contract. Its custom is to send out inquiries and then to award the contract to whichever concern submits the best terms as to price and delivery. He testified that there always has been active competition among pipe and tube makers for the business of his company. He admitted that Judge James H. Reed, president of the Philadelphia Co., is a director of the Steel Corporation and chairman of the board of the Carnegie Steel Co. He testified, however, that Judge Reed has never made any attempt to swing the business of the Philadelphia Co. to the subsidiaries of the Steel Corporation. The only way the Steel Corporation subsidiaries can get orders from the Philadelphia Co., he said, is by submitting better terms than other steel makers.

List of Purchases Shown

Mr. Guffey then submitted a list showing the tonnages of tubular goods purchased by his company each year, and showing also by which companies these goods were furnished, and what prices were paid.

J. H. Reed Jr., purchasing agent of the Philadelphia Co., was then called to the stand. He testified that the data which had been submitted by Mr. Guffey, as to the Philadelphia Co.'s purchases, had been prepared by him (Mr. Reed), and were correct. He explained, however, that numerous purchases made by the Philadelphia Co. had not been included, as on occasion the company makes inquiry over the telephone as to prices and then places the order over the telephone. All the important purchases, however, are made after competitive bids have been received from the various manufacturers, and all such purchases, he said, were indicated on the record Mr. Guffey had submitted. A feature of Mr. Reed's direct examination was that the questioning was conducted by his brother, David A. Reed, of counsel for the defense.

Buy Only in Competition

C. H. Todd, president of the Petroleum Iron Works Co., Sharon, Pa., engaged in steel plate construction, was next called to the stand. He testified that he purchases about 25,000 tons of steel plates and structural material annually. All of this is bought at the lowest price obtainable, after competitive bids have been received from the steel makers. He said that there is active competition between the various plate mills and structural mills and that prices as quoted by the various mills always vary to some extent.

Edward L. Parker, general manager of the Columbia Steel & Shafting Co., Pittsburgh, said his company buys from 25,000 to 50,000 tons of steel bars a year, at the lowest prices obtainable after receiving competitive bids from the various bar manufacturers. He also testified that there is active competition in the sale of steel shafting. He said the Columbia company makes from two to three times as much steel shafting as the American Steel & Wire Co.

Harry Inman, purchasing agent of the Railway Steel Spring Co., New York, said his company, since the time of its organization, has been a large consumer of bars and billets. He stated that there has always been active competition for his company's business on the part of the various bar and billet makers. He produced certain contracts which he had made at various times, whereby the Railway Steel Spring Co. agreed to buy a certain proportion of its requirements from the United States Steel Corporation subsidiaries. Mr. Inman explained, however, that these contracts were never enforced, and that on most occasions the Railway Steel Spring Co. didn't buy all of the material the particular contract specified. He said that it was optional with the buyer whether he would take all the tonnage the contract called for.

How Orders Are Handled

"Do you know of any custom among decent people," queried Judge Dickinson in cross-examination, "where it is understood that when a man signs a contract and agrees to do anything, that it is optional for him to do it?"

"There has been a similar custom in the steel business."

"Just tell me what that custom is."

"The custom has been," said Mr. Inman, "that, if a man signed for, say, 5,000 tons of steel for delivery over a certain period, and during that period business conditions were such that he did not require that steel, that he could not run his plant to capacity, at the end of that specified period the contract was frequently considered as having expired by limitation, although a specified tonnage was originally named in it. That still is the custom."

"You say 'at the end of a specified period'. What do you mean by that?"

"For instance, if we make a contract for, say, 5,000 tons of steel, to be delivered between January and July of a certain year and the buyer takes out only 3,000 tons, it has been frequently, and is right along, considered that that contract was done, although only 3,000 of the 5,000 tons specified have been taken up to the end of the six months. The contract would be considered complete."

Variations in Rail Quotations

"Do you say there is any such custom as that obtaining in the trade?"

"Yes, sir, that has been a general custom."

"Do you mean to say that among the steel people, when a man makes a contract, and if that contract obligates him to do particular things within a particular time, that when he signs that contract it is understood that it is no obligation?"

"That has been my understanding."

"What is the use of a written agreement, then?"

"I cannot tell you that."

"What kind of contracts does that apply to?"

"To bar contracts mainly."

John W. Jamison, president of the Jamison Coal & Coke Co., Greensburg, Pa., called to the stand next, testified that during the past four or five years his company has mined on an average of 2,500,000 tons of coal in its mines in the state of Pennsylvania. In West Virginia it has mines that will produce in the present calendar year, 1,400,000 tons. He said his company buys about 1,200 tons of light rails annually for its mines in Pennsylvania and about half that quantity for its West Virginia mines. Under normal conditions, said Mr. Jamison, light rails are quoted by the different mills at prices which vary about $1 a ton. There is active

competition in the sale of light rails, he said.

Samuel G. Cooper, president of Banning, Cooper & Co., Ltd., Pittsburgh, testified that his company is an iron and steel jobber. It handles billets and slabs, sheet bars, Bessemer and basic pig iron principally, some malleable sometimes, and some little foundry iron and coke. It does a business of about $1,000,000 a year. The prices as quoted by the manufacturers of these commodities, said Mr. Cooper, always vary. Mr. Cooper said he is not guided by the trade papers in his knowledge of market prices, because the trade paper quotations are incorrect.

"They do not have any way of knowing what prices are," said he. "They do not buy anything and they do not sell anything. Sometimes the trade paper quotations are practically correct and at other times they vary from 25 cents to $2 a ton from what is being done in actual sales. I have seen them vary $3 a ton from the price I was paying at the time. In times when mills need business there is a greater margin between the trade paper quotations and the prices at which business is actually being done than when the mills are well supplied with orders. At times when the mills need business Banning, Cooper & Co. sell at lower prices than the trade paper quotations."

Cleveland-Cliffs Activities

With the closing of the Princeton and Austin mines, the Cleveland-Cliffs Iron Co. is producing little ore in the Swanzy district of the Marquette range. It is, however, preparing for a largely increased output in the future. The Stephenson mine is still in operation. The Gwinn is being opened up and will probably be in the producing class shortly. The last work there was done several years ago, when a concrete shaft was put down to the ledge. The Mackinac and the Gardner are also to be made ready to produce. These both have concrete shafts, but at neither has mining work yet been conducted. With its present properties developed, the Cleveland-Cliffs company will have eight or nine mines in the Swanzy country. At Negaunee, the company has closed its South Jackson crusher until next year. The plant had been in operation day and night all during the season, treating the output of the North Lake, Chase and Moro mines, in the Ishpeming field. There is still considerable ore in stock at the Moro, inactive now for more than a year.

South of the old Saginaw mine, 4 miles west of Ishpeming, the Cleveland-Cliffs company has recently started a diamond drill in operation. That ore of good grade will be found is the belief of old-time mining men familiar with the formations. The Cleveland-Cliffs company has been exploring northwest of the tract now being given attention, with results that have not been made known. For months, drills have been operated on farms near Greenwood. The Saginaw was closed more than 30 years ago. It was operated through two shallow shafts and it produced 450,000 tons of hard hematite ore of fairly good quality. The veins were so narrow, however, that mining costs were high. It is thought that if ore is found by the drills, it will be at a depth of 500 feet or more. Mining men are of the belief that the formation is an extension of that in the territory directly to the east, in line with the Section 21, Winthrop and Mitchell properties and the mines in the Cascade field.

VARIED FEATURES

Of Program of Meeting of American Society of Mechanical Engineers.

A very diversified program will be presented at the annual meeting of the American Society of Mechanical Engineers to be held at the Engineering Societies' building, 29 West Thirty-ninth street, New York City, Dec. 2, 3, 4 and 5. The papers to be presented will include the subjects of boilers and their operation, cement, enameling, fire protection with special reference to turbo-generators, oils, and the novel use of sprinkler systems, gas measurement, gas power engineering, lineshaft bearings, machine tools, management, properties of steam, rope drive, steel railway cars, textiles, mill engineering and vacuum cleaning.

An interesting event in connection with the meeting will be the presentation on Wednesday evening of the Grashof medal to George Westinghouse, past president and honorary member of the society. This medal was conferred upon Mr. Westinghouse by the Verein Deutscher Ingenieure, at Leipzig, on the occasion of the joint meeting there with the American engineers last June. Following the presentation of the medal, a lecture will be given on Leonardo da Vinci, by John W. Lieb Jr., past president of the American Institute of Electrical Engineers and past vice president of the American Society of Mechanical Engineers, based upon his remarkable collection of manuscripts, drawings and books relating to the life and work of this distinguished engineer and artist.

The customary reunion this year will take the form of a German dinner reproducing one of the menus from the summer trip abroad and will be held at the Deutscher Liederkranz at half past six o'clock, Thursday evening. A brief account of the trip, illustrated by lantern slides, will be given by Past President Worcester R. Warner. An informal dance will follow the dinner.

The program for the meeting follows:

TUESDAY EVENING, DEC. 2.

Presidential address, followed by a reception in the rooms of the society.

WEDNESDAY MORNING, DEC. 3.

Business meeting, followed by professional session, with the following papers:

Notes on the Further Operation of Large Boilers of the Detroit Edison Co., J. W. Parker.

Setting Tasks for Firemen and Maintaining High Efficiency in Boiler Properties of Steam, R. C. H. Heck.

There also will be papers and informal discussions at this time for those interested in cement and textile manufacture.

THURSDAY MORNING, DEC. 4.

Professional Session

Efficiency of Rope Driving as a Means of Power Transmission, E. H. Ahara.

Comparative Tests of Three Types of Lineshaft Bearings, Carl C. Thomas, E. R. Maurer and L. E. Kelso.

Pitot Tubes for Gas Measurement, W. C. Rowse.

Tests of Vacuum Cleaning Systems, J. R. McColl.

Tests Upon the Transmission of Heat in Vacuum Evaporators, E. W. Kerr.

The Art of Enameling, or the Coating of Steel and Iron with Glass, Raymond F. Nailler.

SIMULTANEOUS SESSIONS

Machine Shop Practice

Continuous Manufacturing by Placing Machines in Accordance with Sequence of Operations, Oscar F. Bornholt.

Gears for Machine-Tool Drives, John Parker.

Cast Iron for Machine Tool Parts, Henry M. Wood.

A Record of Pressed Fits, C. F. McGill.

Gas Power

A New Process for Cleaning Producer Gas, H. F. Smith.

Papers are expected on gas and oil engine practice.

FRIDAY MORNING, DEC. 5.

Professional Session.

Fire Protection

The Fire Hazard in Turbo-Generators, G. S. Lawler.

Extinguishing Fires in Oils and Volatile Liquids, Edward A. Barrier.

Control of Automatic Sprinkler Valves, Fred J. Miller.

Announcement of tellers of election and presentation of the president elect.

On Friday evening, alumni of certain of the technical schools who may be in attendance at the meeting, will gather for reunions. Special arrangements have been made for dinners, theater parties and meetings for alumni of Stevens, Worcester Polytechnic, Brooklyn Polytechnic, Yale and Cornell. On Thursday and Friday afternoons, excursions to various industrial plants and points of interest in New York City and vicinity will be made.

FOREIGN MARKETS

GERMAN IRON TRADE

Berlin, Oct. 30.—It is still impossible to indicate the long looked for improvement in the German iron industry. On the other hand, one hears of further weakening of prices in many branches. Recently bars were reduced from 96 marks and 100 marks to 95 marks and 98 marks ($22.56 and $23.50 to $22.32½ and $23.03), plates from 106 marks and 110 marks to 104 marks and 108 marks ($24.91 and $25.85 to $24.44 and $25.38), boiler plates from 116 marks and 120 marks to 114 marks and 118 marks ($27.26 and $28.20 to $26.79 and $27.73); sheets were lowered 2 marks to 120 marks and 125 marks (47 cents to $28.20 and $29.37½), and rolled wire 5 marks to 117½ marks ($1.17½ to $27.61¼); iron bars were reduced 5 marks per ton to 138 marks ($1.17½ to $32.43). The pipe market is demoralized; steel and iron bolts have been sharply cut; girders have been lowered 10 marks ($2.35) within a few weeks. In fact, speaking generally, the autumn season has been most disappointing. Competition with foreign countries is pushed to extremes in the matter of price-cutting; 4-inch steel blocks are offered at 76s ($18.50), 2-inch billets at 80s ($19.47), sheet bars at 85s ($20.69), sheets No. 20 at 128s and 129s ($31.16 and $31.40), hoop iron at 120s and 122s 6d ($29.21 and $29.82), f. o. b. shipping ports.

Perhaps something of a little more cheering nature is found in the statement just issued by the Ship Building Steel Syndicate, according to which it has booked recently about 70,000 tons, and is in negotiation for a further 30,000 tons. Pig iron production has recently decreased a little, and prices for next year's delivery have been reduced 2 marks and 3 marks (47 cents and 70½ cents) per ton, but no important business has so far been placed. Prices have been fixed by the syndicate as follows: Spiegel iron, 10-12, 79 marks ($18.56½); Siegvalley steel-making iron, 69 marks and 70 marks ($16.21½ and $16.45); foundry No. 1, 75½ marks ($17.74½); foundry No. 3, 71 marks ($16.80½); Luxemburg No. 3, 63 marks ($14.81); Luxemburg puddling, 60 marks ($14.10); hematite, 79½ marks ($18.68½); scrap is declining. Half products are doing less for export than recently. Bars are demoralized, and in big lines have been taken as low as 92 marks and 93 marks ($21.62 and $21.85½) for the home market, while for export as low as 90 marks ($21.15), f. o. b. Antwerp, has been accepted. In pipes the recently formed loose syndicate has already gone to pieces through the action of the Mannesmann group. In steel plates as little as 100 marks ($23.50), f. o. b., is stated to have been accepted, and some business is mentioned at even less.

Wire is clearly in a very depressed condition, almost to the point of demoralization. Rail and rolling stock mills are doing well.

Very pessimistic remarks in regard to steel trade prospects are being made at the meetings of the leading companies now being held.

AUSTRIAN IRON TRADE

Vienna, Oct. 29.—The report just issued by the Alpine Montan-Ges, Vienna, the largest of the Austrian steel companies, states that the output of most departments has been reduced by 30 to 50 per cent. International competition is exceedingly keen. At the general meeting, just held, of the Prague Iron Co., Prague, it was stated that trade was in a wretched condition, and there were no signs of improvement. New business was almost impossible to obtain. For September the sales of the Austrian Iron Cartel are returned at 41,700 tons, or 3,500 tons less than for August, 1913, and 29,700 tons less than for September, 1912.

South Russian Manganese

St. Petersburg, Oct. 29.—The production of manganese ore in the Nikopol district of South Russia in the first half of the year, according to the report of the Congress of South Russian Mine Owners, amounted to 7,510,000 poods (121,129 tons), or 790,000 poods (12,740 tons) more than in the corresponding period of last year. The capacity of the works is estimated at 16,500,000 poods (266,129 tons). Manganese is only being produced at three mines in the district.

SWEDISH IRON TRADE

Stockholm, Oct. 29.—Some dullness is being shown in the iron trade of this country although until lately industry was making records in activity. All opinions and pronouncements during the latter part of last year and at the turn of the year bear witness to a particularly keen activity in the majority of the most important branches of industry. The trade returns for the year show that exports increased incomparably more than imports. In raw materials and products of industry the increased exports appear to be general; bricks, implements, iron ore, machinery, matches, paper, pig iron, timber, tools, and wood pulp, etc., have been in increased demand at good prices. The year closed under happier auspices for trade than could be recorded for a long time.

If the iron trade of the past year be regarded in its entirety record figures will be found for most kinds of productions, as well as for exports. For example, the export of pig iron rose by nearly 36 per cent—compared with the last quarter of 1911, by no less than about 60 per cent in the corresponding quarter of 1912.

BELGIAN IRON TRADE

Brussels, Oct. 30.—Wherever one goes around the leading iron districts here one finds a gloomy tone prevalent. The troubles include lack of orders, acutest competition from Germany, declining prices, vanishing profits to a point at which the exchange of an old shilling for a new one becomes impossible. Thus one hears of gradually extending shortening of output, of night shifts cut out, of only five days a week running of machinery. Offerings from Germany cut into everything—hoop iron, bars, sheets, etc. The result is a further fall in prices in the last week or two, despite reductions in the output; recent export prices run about as follows for f. o. b. Antwerp: Steel bars, £4 8s ($21.42); iron bars, £4 12s ($22.39); steel plates, £5 1s ($24.58½); sheets, £5 2s 6d and £5 10s ($24.95 and $26.77), according to thickness; rods, £4 18s ($23.85), and so on.

Export returns for September are still moderately satisfactory.

MEN OF THE IRON TRADE

M. G. DOLL has been made general sales manager for the Bury Compressor Co., Erie, Pa.

FORD CORILL has succeeded Andrew Clark, resigned, as superintendent of the open-hearth steel department of the Carnegie Steel Co., at Farrell, Pa.

W. A. EVERSON, First National Bank building, Cincinnati, has been appointed resident manager of the F. G. Hartwell Coal & Coke Co., with head offices in Chicago.

PETER A. B. WIDENER, director of the United States Steel Corporation, and one of the leading capitalists of the country, celebrated his seventy-ninth birthday at Philadelphia, Nov. 13.

ARTHUR SIMON, chief engineer of the Cutler-Hammer Mfg. Co., Milwaukee, is expected to return to this country soon from an extended business trip through the industrial districts of Germany.

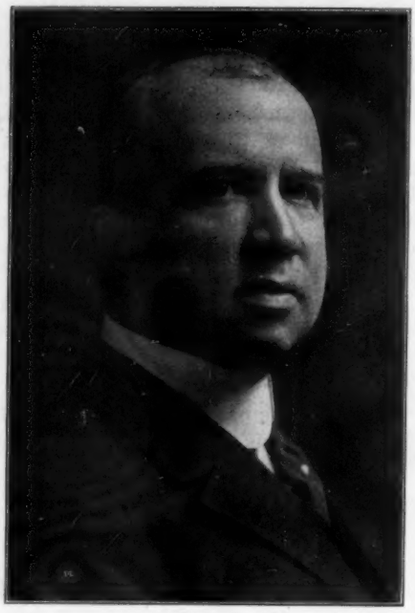
ROBERT P. SCHOENIJAHN, formerly connected with L. B. Marks and J. E. Woodwell, in an engineering capacity, has been elected factory manager of the M. W. Robinson Co., Newark, N. J.

H. E. MOON has been appointed manager of the Salt Lake City office of the Sullivan Machinery Co., succeeding M. G. Doll, resigned. Mr. Moon was previously associated with the Denver branch of the company.

A. J. REED, formerly associated with the Dayton office of the Westinghouse Electric & Mfg. Co., has resigned that position to become manager of the Cleveland branch of the Robbins & Myers Co., Springfield, O.

WILLIAM B. STOOP, formerly superintendent of the North works of the Carnegie Steel Co., Youngstown, more recently manager of a steel works at Portsmouth, O., has become general manager of the Treadwell Construction Co., Easton, O.

ANDREW CARNEGIE will be invited by A. A. Hammerschlag, director of the Carnegie Institute of Technology, Pittsburgh, to be present on Carnegie day, Nov. 25. The honorary degree of doctor of engineering will be conferred upon William McConway, of the McConway-Torley Co., Pittsburgh. The new machinery hall will be dedicated on that day.



LORENZO C. DILKS

LORENZO C. DILKS, recently appointed general manager of sales of the Eastern Steel Co., Pottsville, Pa., is well known in the metropolitan district, where he will make his headquarters. The office is a newly created one. Mr. Dilks has been contracting manager of the company in New York for several years, having previously been in the employ of the American Bridge Co. for a number of years.

GEORGE NASH, general superintendent of the plant of the Pittsburgh Steel Co., at Monessen, Pa., has been appointed general manager of the company's entire works, located at Monessen, Glassport and Hamilton, Ont. C. J. Morgan, former assistant to Mr. Nash, has been appointed general superintendent. For 11 years Mr. Morgan was an assistant general superintendent of the plant at Glassport, where he started as a master mechanic.

CHARLES T. JEFFERY, president and general manager of the Thos. B. Jeffery Co., automobile manufacturer, Kenosha, Wis., has made a gift of two Jeffery roadsters to the city of Kenosha. One car will be for the use of the chief of the police department and the other for the fire marshal's use. Mr. Jeffery has previously made gifts of cars and motor-propelled fire apparatus to the city of Kenosha in appreciation of the protection given its immense property interests.

CHARLES E. DINKEY, general superintendent of the Edgar Thomson plant of the Carnegie Steel Co., at Bessemer, Pa., entertained the Women's Club of Braddock last week at the new club house of the Edgar Thomson works. Mr. Dinkey has taken an active interest in the welfare work of the Woman's Club, and has assisted to a great extent in providing and equipping play grounds for the children living near the mill. L. H. Burnett, general director of the welfare work of the Carnegie Steel Co., and his assistant, Albert Brown, told of recent social work undertaken by the Carnegie company.

EMPLOYES' INSURANCE

Discussed at Meeting of New England Foundrymen.

Much interest in the discussion of the question how to help their employes to obtain insurance at a minimum of cost, was shown by the 75 to 100 foundrymen in attendance at the monthly meeting of the New England Foundrymen's Association at the Exchange Club, Boston, Wednesday evening, Nov. 12. This subject came before the meeting through the address on "Savings Bank Life Insurance", by H. W. Kimball, secretary of the Massachusetts Insurance League. The speaker told what is being done in this line as a result of a recently enacted state law, enabling certain savings banks to write life insurance. Six banks of the state have been empowered to issue insurance policies and other banks are acting as agents in this matter for these specified institutions. Moreover, nearly 200 different manufacturers, in behalf of their employes, are serving as agents of the different banks in getting insurance for their men. The object of the law is to give the workmen the benefit of as low a rate on insurance as is possible to be obtained from regular companies by persons of larger means. The measure so far has worked quite successfully. Some criticism of the law was made in the discussion, because it provides that foundry employes are included in the class which is required to take out insurance on the monthly basis.

Again Postpone Sale.—The advertised sale of the steel works and bridge shop on Staten Island of Milliken Bros., Inc., in the matter of the bankruptcy of that company, has again been postponed to Dec. 2. This action was caused by the fact that the committee which has been working upon a plan of reorganization, has not yet so advanced its efforts that it can bid upon the plant. It is expected that this committee finally will bid in the property under the reorganization plan. The date that had been fixed for the sale prior to the postponement was Nov. 11.

W. H. Leland & Co., Worcester, Mass., manufacturers of grinding and drilling machines and crankshafts, who are erecting a new factory to cost $30,000, have changed the firm name to the Leland-Gifford Co. The new title carries with it no change in the personnel of the firm's organization or management.

The New York, New Haven & Hartford railroad has issued a small list of four machine tools. One of them is a vertical milling machine for slotting motor fields. The list was put out from the office of the purchasing agent, New Haven.

The Washington Mills Emery Mfg. Co., North Grafton, Mass., will build an extension on the site of its present machine shop, which will be razed. It will be two stories, 55 x 60 feet.

NEW BUSINESS

In New York, the last week was a satisfactory one in machinery circles, as compared with the three or four weeks preceding. The General Electric Co. bought a 7-foot radial drill and some other machinery for its Schenectady shops and four 50-ton cranes for its Pittsfield shops. Some other orders were placed for cranes. Small orders for all kinds of machinery helped to roll up a fair total of business for the week. The week was also satisfactory from the point of view of inquiries received. The New York, New Haven & Hartford put out a small list involving four tools, one of which is a vertical milling machine for slotting motor fields. Business, however, continues a good deal below normal and machinery houses in the metropolitan district, in most cases, are unable to book enough business to keep their plants busy or to keep busy the plants of the manufacturers they represent. As a result, they are making every effort to take as much as possible of the business offered. Consequently, prices are quoted very low on all business in which there is competition. Demand from abroad has fallen off somewhat in volume. France and Italy are now the most active European buyers of American machinery; considerable railroad and car shop machinery is being shipped to these countries.

In Pittsburgh, the machine tool market is unchanged in position. Conditions have been dull for the last couple of months, and it is not believed active demand for tools will be experienced until spring, by which time it is thought general trade conditions will be more normal. Builders of heavy rolling mill equipment are well protected by orders taken earlier in the year, and a number of interesting contracts have been placed recently.

In Cincinnati, makers of machine tools state that recent reports that some fair sized orders have lately been received from foreign countries are entirely unfounded, and that business, taken as a whole, is still very dull with small prospects of a betterment before the end of the present month, if then. Statistics compiled by several machinery manufacturers show that October was one of the dullest months experienced by the trade for several years, and from all appearances November will not show much of an improvement. There is plenty of labor available, as only a few shops are running over 65 per cent of their total capacities. A few good sales of second-hand machinery have been made recently, but this branch of the trade is still far from satisfactory. Foundries are not very busy, as they have been greatly handicapped by the falling off of machine tool business.

ALABAMA

BIRMINGHAM.—The National Cast Iron Pipe Co. is in the market for 5-ton, 2-motor monorail hoists.

BIRMINGHAM.—The National Cast Iron Pipe Co. plans to increase its capital from $5,000 to $300,000 for working capital and enlarging its plant.

GATE CITY.—The McDonough Ore Mining Co., Birmingham, recently increased its capital stock to $35,000, and plans to establish a plant here for the manufacture of lime, flour, concrete and building stone, etc., estimated to cost about $30,000.

ARIZONA

PHOENIX.—The Peerless Vacuum Engine Co. has been incorporated; $1,000,000; by C. F. Goldsborough, L. B. Durnil, C. W. Copeland, D. H. Kemp, C. M. Bowers, George Baldridge, F. P. Sizer, J. J. Davis, S. A. Chapell, Dr. A. Jones, et al.

ARKANSAS

TEXARKANA.—The Southern Gas & Electric Co. plans to erect a 30 x 90-foot machine shop.

CALIFORNIA

BAKERFIELD.—The Lerdo Land Co. plans to construct an irrigation system for which concrete pipe will be used. Estimated cost $60,000. C. E. Miller, Los Angeles, is interested.

LOS ANGELES.—The Atchison, Topeka & Santa Fe Railway Co. recently took out a permit for a 60 x 148-foot machine shop. H. S. Wall, San Bernardino, Cal., superintendent of shops.

OXNARD.—The Dunn Mfg. Co., manufacturer of oil well tools, plans to enlarge its factory and install additional and improved machinery equipment.

SAN FRANCISCO.—The Fire Protection Equipment Co. has been incorporated; fire apparatus; $15,000; by L. B. Krieger, E. W. Newell and H. E. Monroe.

SAN FRANCISCO.—The Rankin Process Co. has been incorporated to conduct metal reduction works; $100,000; by H. B. Lyon and C. Hill, San Francisco.

SAN FRANCISCO.—The Gorham Fire Apparatus Co. has been incorporated to manufacture fire-fighting apparatus; $25,000; by W. J. Gorham, W. R. Gorham and J. White.

CONNECTICUT

BRIDGEPORT.—Jacob Huber is planning to erect a three-story, 60 x 90-foot factory building of brick and concrete.

BRIDGEPORT.—The Locke Steel Belt Co. recently purchased a site here, upon which it plans to erect a concrete factory.

BRIDGEPORT.—The Salts Textile Co. plans alterations and additions estimated to cost about $75,000.

BRIDGEPORT.—The American Cyclecar Co. advises it is building demonstrators this winter and will begin quantity production of its type of cars about March 1.

DANBURY.—Jacob Rupert Co. has completed plans for a refrigerating plant to cost about $25,000. Philip N. Sunderland, architect.

GREENWICH.—The board of education has received plans for the construction of two schools to cost about $115,000.

NEW HAVEN.—The Arens Centerfreeze Co. has been incorporated; icemaking machines; $500 000; by George G. Downing, William G. Downing and Benjamin F. Miller, New Haven.

NORWICH.—The Tunnel Power Co. has been incorporated; $100,000; by Charles W. Comstock, president.

DELAWARE

SEAFORD.—The Seaford Iron Works plans to erect a new plant on a plot of ground adjoining its foundry. John D. Stewart is interested.

WILMINGTON.—The Wilmington Free Institute Library plans to erect a new library at an estimated cost of $220,000.

WILMINGTON.—The National Machine & Vise Co. has been incorporated; $1,000,000; by F. D. Buck, B. Grawl and George W. Dillman, Wilmington.

WILMINGTON.—The Nicholson Furnace Co. has been incorporated; manufacture heaters and furnaces of all kinds; $125,000; by Herbert E. Latter, W. J. Maloney and Oscar J. Reichard, Wilmington.

DISTRICT OF COLUMBIA

WASHINGTON.—Bids will be received until Nov. 25 by the Bureau of Supplies and Accounts for furnishing the Puget Sound navy yard a quantity of riveted steel floor plates and steel angles. (Schedule 5895).

WASHINGTON.—Sealed proposals will be received at the office of the general purchasing officer, Isthmian canal commission, until Dec. 1, for furnishing or furnishing and erecting steel rolling doors for permanent shop building No. 3 at Balboa. Further information may be obtained upon application to F. C. Boggs, major, Corp of Engineers, U. S. A., general purchasing officer. (Circular No. 809.)

WASHINGTON.—Sealed proposals will be received at the office of the general purchasing officer, Isthmian canal commission, until Dec. 4, for furnishing the following supplies: Galvanized steel or iron, steel cable, steel wire, galvanized ridge roll, rivets, bolts, nails, screws, taps, cast iron washers, chisels, sheet brass, brass tubing, hinges, files, shovels, wrenches, hammers, hack-saw blades, bolt cutters, galvanized buckets, steam whistles, metallic tapes, marine clocks, gaskets, belt lacing, magnesia pipe covering, magnesia boiler lagging, fire clay, lime, pipe fittings, etc. Further information relating to these requirements (Circular No. 808) may be obtained on application to F. C. Boggs, major, Corp of Engineers, U. S. A., general purchasing officer.

FLORIDA

TAMPA.—The Haney Fire Apparatus Co., recently incorporated with a capital of $2,000,000, will receive proposals until Dec. 1 for the erection of three buildings 85 x 200 feet estimated to cost about $75,000. Foundry equipment and pattern and lathe machinery will be installed. Machinery bids will be asked later to be opened Mar. 1.

GEORGIA

ATLANTA.—The Knights of Pythias plan to erect a $50,000 home here. Russell K. Smith, president.

AUGUSTA.—The Southern Tire & Rubber Co. is planning to erect an automobile tire

factory here, plans calling for a 50 x 200-foot brick structure to have a daily capacity of 100 tires.

BRUNSWICK.—The Morgan-Gould Lumber Co. plans to erect a 24 x 30-foot boiler house to replace the structure recently damaged by fire.

MACON.—The mill building of the Interstate Chemical Co. was recently damaged by fire. Loss $75,000.

IDAHO

BOISE.—City will erect municipal electric distributing system if council can arrange to buy current from government Arrowrock dam site.

COEUR D'ALENE.—New machinery will be purchased by the Couer d'Alene Lumber Co. during winter shut-down, according to reports.

MULLAN.—The American Concentrating Co. has been incorporated with a capital stock of $500,000. Orrin H. King is interested.

ROBERTS.—The board of county commissioners will receive bids Dec. 1 for two steel bridges, one with 100-foot span, both across Snake river.

ST. ANTHONY.—Bids will be received until Dec. 1 by the board of county commissioners for the construction of a 100-foot steel span bridge over the Snake river.

WALLACE.—The Lucky Friday Mining Co. has been incorporated; $1,500,000; by F. M. Jones, J. H. Wade, et al.

ILLINOIS

CHICAGO.—The Acme Supply Co., manufacturer of car furnishings and metal specialties, plans to erect a brick foundry at a cost of about $11,000.

CHICAGO.—The Enterprise Parlor Furniture Co. plans to erect a two-story brick factory building estimated to cost about $15,000. Adolph Woener, architect.

CHICAGO.—The Bell-Howell Co., manufacturer of moving picture machines, will build a two-story brick factory here estimated to cost about $20,000. Perry Thomas, architect.

CHICAGO.—The Berry Window Ventilator Co. has been incorporated; ventilators; $100,000; by T. H. Berry, W. C. Ambruster and G. W. Clarkson, Chicago.

CHICAGO.—The Metropolitan Appliance Co. has been incorporated; mechanical electrical devices; $10,000; by George W. Levin, W. F. Cummings and W. J. Mahler.

CHICAGO.—The Automatic Gas Regulator Co. has been incorporated; gas and electric appliances; $20,000; by McDonald Lane, L. A. Landon and I. F. Royer.

CHICAGO.—The D. D. Johnson Co. has been incorporated; machinery and implements; $100,000; by D. D. Johnson, F. McKinley and H. Hovander.

CHICAGO.—The Okadee Co. has been incorporated to manufacture railroad supplies; $25,000; by E. Keig, Arthur G. Hollingshead and Paul Carpenter.

CHICAGO.—The Johnson Electric Appliance Co. has been incorporated; electrical appliances; $25,000; by H. B. Johnson and J. F. Williams, Chicago.

CHICAGO.—The Northwestern Electric Castings Co. has been incorporated; electrical appliances; $10,000; by Herschel V. Shepherd, Howard W. Lewis and William T. Church.

CHICAGO.—The Voss Calculator Co. has been incorporated to manufacture calculating machines; $100,000; by E. C. Ferguson, H. G Voss and R. F. Keane.

CHICAGO.—The United States Patent Roofing Co. has been incorporated to manufacture roofing materials; $30,000; by G. H. Hodson, W. F. Blakely and C. Hanratty, Chicago.

DECATUR.—The Wabash railroad recently completed the erection of its locomotive shops here, and equipment is now being installed. The shops at Springfield, Ill., will be moved to Decatur. The cost of the new shops is estimated at about $2,000 000.

EAST ST. LOUIS.—The Harvard Mfg. Co. has been incorporated; machinery; $4,000; by Eugene F. Cook, Francis Kirsch and Herman F. Haarstick.

PEORIA.—The Bradley Estate plans to erect a two-story brick factory for the manufacture of its specialty to cost about $10,000.

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INDIANA

CRAWFORDSVILLE.—The American Motor Wheel Co. has been incorporated; automobile trucks and motors; $600,000; by W. H. Owen, C. S. Rowland and J. V. Wilson.

EVANSVILLE.—Damage to machinery and stocks amounting to $17,000 was suffered by fire at the shop of the J. C. Smith Hoe & Tool Co., insurance amounting to $4,500. The company plans to rebuild at once.

INDIANAPOLIS.—The Time Shop & Light Machinery Specialist Co. has been incorporated; small machinery and clocks; $6,000; by A. A. Clark, F. W. Summer and G. M. Clark.

NEW ALBANY.—The city council has under consideration the purchase of a flushing machine for use on the streets.

RICHMOND.—The K. D. Cabinet Co. has been incorporated; metal products; $30,000; by W. H. Turner, G. E. Kemper and R. C. Russell.

IOWA

DAVENPORT.—Briegel & Hagius have been incorporated to deal in the manufacture of machinery; tools, mechanical appliances, etc.; $25,000; by Theodore Briegel, president and treasurer, and G. H. Hagius, vice president and secretary.

MUSCATINE.—The Muscatine North & South railway plans to rebuild 10 bridges between here and Elrick Junction, a distance of about 30 miles. H. B. Holbert, vice president and general manager.

KENTUCKY

COVINGTON.—The Reliable Safe & Lock Co., recently incorporated, plans to erect a 50 x 120-foot two-story brick plant here.

COVINGTON.—The Automatic Coin Changer Co. has been incorporated; $500,000; by J. P. Smott, Dallas, Tex., George Alter, Cincinnati, and E. Walker, Covington.

COVINGTON.—The building of the Covington Automobile Co., including its repair shop, was destroyed by fire, and new machinery will be required in the company's new location.

FRANKFORT.—The American Iron Works has been incorporated; $25 000; by Charles H. Gerrard, John Hardy, C. E. Gerrard and A. Hardy.

HARRODSBURG.—Bonds will probably be voted for the improvement of the waterworks system.

MARION.—Bonds have been voted for a waterworks system, which will be constructed at once. Address George W. Stone, mayor.

PADUCAH.—Extensions to the plant of the Dr. H. T. Hessig Medicine Co. recently incorporated with $25,000 capital stock, will be built, special equipment for making and bottling patent medicines being required.

LOUISIANA

GRETNA.—The New Orleans Brick & Stone Co., recently incorporated with a capital of $160,000, has purchased a site of 200 feet frontage on the river upon which it plans to erect a new plant. L. A. Marrero, president.

NEW ORLEANS.—The Crescent City Construction Co. plans to erect a brick addition to its warehouse here at a cost of about $5,000.

NEW ORLEANS.—The H. W. Johns-Manville Co. advises its new concrete building in New Orleans will be devoted to office and warehouse purposes. One or two elevators and perhaps a spiral chute for sending packages from upper stories will be needed. Toledano & Wogan, New Orleans, are architects.

MARYLAND

BALTIMORE.—The Consolidated Gas, Electric Light & Power Co. plans to erect a two-story 83 x 104-foot brick and concrete electric plant here. West Construction Co., contractor.

MASSACHUSETTS

BOSTON.—The Parker Carburetor Co. has been incorporated; $250,000; by George E. Parker, Kenneth E. Parker and John T. Clark.

FITCHBURG.—The Falalah Paper Co. plans to erect an office and laboratory building here. Plans call for a two-story, 38 x 200-foot brick and mill construction building.

LOWELL.—The Lamson Consolidated Store Service Co., manufacturer of bundle carriers, plans to erect a three-story foundry building here to cost about $60,000.

NORTH GRAFTON.—The Washington Mills, manufacturer of emery products, plans to erect a 55 x 60-foot two-story addition.

PEABODY.—The Peabody-Woburn Machine Co. has been incorporated; $50,000; by Daniel P. O'Brien and Thomas H. Marrinan.

SOUTH FRAMINGHAM.—The United States Lens Co. plans to erect a one and two-story addition at a cost of about $60,000, contract for which was recently awarded to the J. J. Rindiville Co.

MICHIGAN

DETROIT.—The Kerr Machinery & Supply Co., manufacturer of steam and electric pumps and steam turbines, is having plans prepared for an eight-story reinforced concrete building. Address David M. Kerr.

DETROIT.—The Conway-McLeod Co. advises its recent increase of capital from $15,000 to $50,000 is for the purpose of enlarging its business, which consists largely of a foundry for producing plumbing and heating goods.

DETROIT.—The Heinz Electric Co., Detroit, advises it will manufacture a complete line of ignition apparatus, consisting of magnetos, spark coils, carburetors, spark plugs, timers and switches, at Walkerville, Ont. No plant is to be built now, but one is being considered for the future.

LANSING.—The American Stone Co. has completed plans for the erection of a factory for rubbing and polishing bricks.

MINNESOTA

DULUTH.—The Resilient Auto Wheels Co. has been incorporated; automobile wheels and other appliances; $50,000; by Arthur Jutila, Helmer Johnson, Osmond Thompson, A. W. Youngkvist and B. E. Wellberg.

DULUTH.—The Duluth Corrugated & Roofing Co. recently purchased a site of 37 lots, upon which it plans to erect a new factory, work on which will commence next spring, with a view to completion by early fall. Estimated cost $100,000.

MISSISSIPPI

JACKSON.—The city is having plans prepared for the construction of four reinforced concrete bridges over Town creek. Estimated cost $25,000.

MISSOURI

ST. JOSEPH.—The Anderson Automatic Engine Works has been incorporated; $50,000; by C. C. Anderson, H. S. Kratsinger and W. M. Campbell.

ST. LOUIS.—The Dielectric Mfg. Co. recently purchased an 80 x 190-foot site, upon which it plans to erect additions to its plant.

ST. LOUIS.—The erecting room of the St. Louis Car Co. was recently damaged by fire at a loss of about $8,000.

ST. LOUIS.—The St. Louis Mill Machine & Tool Co. plans to erect a 40 x 117-foot machine and blacksmith shop estimated to cost about $12,000. Fruin-Colnon Construction Co., contractor.

MONTANA

GLASGOW.—The contract for installing water and sewer mains has been awarded to George W. Kemper at $18,106.

GREAT FALLS.—The American Brewery plans to erect a three-story reinforced concrete addition to its plant. Bernard Barthel, Chicago, architect.

NEW HAMPSHIRE

KEENE.—The Imperial Metal Products Corporation, of New York City, recently incorporated with a capital of $500,000 for the manufacture of metal furniture and furnishings, plans to erect a plant here to be completed by February, 1914. The main building will be 61 x 255 feet, four stories, with a side addition 18 x 60 feet, four stories, of brick and steel construction. Equipment will be electrically operated, power being obtained from a hydro-electric plant nearby.

NEW JERSEY

AMPERE.—The Ampere Supply Co. has been incorporated; electrical appliances; $100,000; by H. J. Jaeger, R. H. Herschman, A. K. Soldman Jr., F. F. Townsend, R. R. Mitchell, Ampere.

CAMDEN.—The Delmond Mfg. Co. has been incorporated; valves; $50,000; by L. M. Cole, Harry L. Brittingham and Samuel Donelson.

PATERSON.—E. & Z. Van Raalte plan to erect a four-story, 61 x 154-foot building for

the manufacture of veilings at a cost of about $50,000.

NEW YORK

ALBANY.—The John H. Jackson Tile Co. has been incorporated; brick, stone and other building materials; $25,000; by F. V. Griesman, Voorheesville, and F. C. Yedder and P. Holland, Albany.

BUFFALO.—The Buffalo Nipple & Machine Co. recently purchased a site here, upon which it plans to erect an addition to its plant. George Keipper, president.

BUFFALO.—The Queen City Foundry Co. has been incorporated; mining and metal products; $20,000; by J. Alfred Gauthier, Charles H. Kress and T. Hackett, Tonawanda.

COLLEGE POINT.—The Empire Art Metal Co., Inc., has been incorporated; $250,000; by John W. Rapp, Andrew J. Connell and Wm. C. Lange, College Point.

LONG ISLAND CITY.—The Loose-Wiles Biscuit Co. plans to erect a two-story, 200 x 200-foot addition to its plant here at an estimated cost of about $80,000.

MANHATTAN.—The Victor Brass Works, Inc., has been incorporated; plumbers' supplies; $115,000; by Morris J. Junger, E. Volinsky, Samuel J. Joseph, 837 Beck street, New York City.

MANHATTAN.—The Horne & Crane Engineering Co., Inc., has been incorporated; engineering devices; $50,000; by L. W. Horne, Brooklyn, and W. N. Crane, New York City.

NEW YORK CITY.—The Auto Pad Co. has been incorporated; auto trucks, motor cars and boats; $1,000,000; by Joseph F. Curtain, Clarence E. Eaton, New York City.

NIAGARA FALLS.—The Pollard Mfg. Co., manufacturer of stone and marble working machinery, plans to erect a $25,000 plant here, contract for which was recently awarded.

NIAGARA FALLS.—The Niagara Falls Furnace Co. is erecting a plant on the Erie railroad here. The company recently took over the plant of the Fremont Furnace Co., Fremont, O. A. V. Davidson, president.

ROCHESTER.—The Newman Walbridge Co., Inc., has been incorporated; $200,000; by Maulsby Kimball, Franklin D. L. Stone and Charles A. Hamlin, Buffalo.

WATKINS.—The Smith Veneer Machinery Co., Inc., has been incorporated; $10,000; by Able W. Smith and Elmer S. White.

YONKERS.—The Y. M. C. A. plans to erect a $100,000 building here. Alfred Bunker, president.

NORTH CAROLINA

CHARLOTTE.—A new jail and other public buildings are being planned at an estimated cost of $110,000. W. M. Long, chairman.

CONWAY.—Surveys are being made for the construction of a water and sewer system estimated to cost about $25,000.

OHIO

BELLEFONTAINE.—The Cleveland, Cincinnati, Chicago & St. Louis railway plans to erect a car repair shop here. J. T. Luscomb, Bellefontaine division master.

BUCYRUS.—The New York Blower Co. recently started construction work on an addition at its Warren street plant. Plans call for a two-story frame structure, to be used temporarily. Any permanent improvement the company makes will be at the South Bucyrus plant.

CINCINNATI.—The box factory of H. D. Smith & Co. was recently damaged by fire. Estimated loss, $15,000.

CINCINNATI.—Herman Wolf & Co. plans to erect a two-story addition to their factory here. A. Kunz Jr., architect.

CINCINNATI.—The General Auto Parts Co. has been incorporated; automobile parts; $30,000; by George Osler, Paul V. Connelly, Saul Stern, I. L. Cressler and Walter K. Sibbard, Cincinnati.

CINCINNATI.—Bids are being received by D. H. Burman & Co., architects, Chicago, for the structural steel to be used in the addition to the Union Trust building, Cincinnati, which will be 38 x 100-feet, 18 stories. The estimated cost is $350,000.

CINCINNATI.—A new office building, from 12 to 15-stories, will be erected on Walnut street between Fifth and Sixth streets, Cincinnati, as soon as the present leases on this property expire. The building will be 100 x 123-feet and will have a frame-work of steel.

CINCINNATI.—The plant of the Schacht Motor Car Co., Winton Place, Cincinnati, has been purchased by the Huenfeld Co., also of Cincinnati, manufacturer of stoves and ranges. The plant was sold at receiver's sale, and adjoins that of the Huenfeld Co. The price paid was $17,350.

CINCINNATI.—Sealed proposals for the structural iron and steel to be used in the erection of the Tuberculosis sanitarium, Cincinnati, will be received by the Cincinnati Board of Hospital Commissioners until Dec. 9. Bids will also be received until that time for the sheet metal work and elevators to be used in this building. Tietig & Lee, architects, Cincinnati, are in charge of construction.

CLEVELAND.—The Big Four Milling Co. was recently granted a permit for the erection of a two-story grain elevator to cost about $35,000.

CLEVELAND.—The $850,000 bond issue for the Brooklyn Brighton bridge has carried, and plans will be prepared by W. A. Stinchcomb, construction work to be advertised in the spring.

CLEVELAND.—The Osborn Crew Mfg. Co. has been incorporated; stamped steel pulleys; $10,000; by Fleming H. Crew, Henry H. Gall, Earl W. Lester, Richard B. Lee and G. M. Gallegher.

COLUMBUS.—The Wing & Myers Foundry Co. has been incorporated to deal in all kinds of iron and steel products; $20,000; by J. E. Snyder, E. L. Snyder, C. H. Wing, N. A. Beach and S. C. Myers.

ELYRIA.—The Superior Metal Products Co. has let a contract for an addition to its plant, 41 x 48 feet, brick and steel.

MT. VERNON.—The C. & G. Casper Co. is installing three 21½ x 24 twin tandem gas engines for the Southern California Gas Co., Taft, Calif. The same size installation is being put in at Bigheart, Okla., for the Quapaw Gas Co. These bring the output of Cooper gas engines for 1913 to over 10,500 horsepower.

SPRINGFIELD.—The Igou Bros. Mfg. Co., manufacturer of candy machines and automatic machines, will rebuild the plant recently damaged by fire.

SPRINGFIELD.—The Detroit, Toledo & Ironton Railway Co. plans to rebuild its roundhouse here, which was recently damaged by fire. G. R. Endert, Springfield, chief engineer.

TOLEDO.—The Carl Electric Vehicle Co. has been incorporated; electrical vehicles; $300,000; by L. M. Tenders, et al.

TOLEDO.—The Radial Mfg. Co. has been incorporated; milk machinery; $10,000; by Rathburn Fuller, John H. Taylor, Robert A. Haines, C. S. Coup and Richard A. Hayes.

WOOSTER.—The Buckeye Aluminum Co. plans to erect a 60 x 85-foot two-story addition. The first floor will be of concrete, while the second floor will be frame. William Long has been awarded the contract.

OKLAHOMA

FAIRLAND.—The Fairland Light & Power Co. is in the market for a 30-kilowatt generator.

OKMULGEE.—The plant of the Western Machine Co. was recently damaged by fire. Estimated loss $15,000.

SAND SPRINGS.—The German American Car Co., Chicago, plans to erect car shops here, a 10-acre site for which has already been purchased. The company advises that particulars have not as yet been decided upon as to machinery needed and cost of building.

OREGON

ASTORIA.—Clatsop county has voted a bond issue of $400,000 for new roads.

ASTORIA.—The Chas. R. McCormick Lumber Co. will erect several mills on Columbia river.

BAY OCEAN.—The Bay Ocean Natatorium Co. will build a natatorium at a cost of $35,000 exclusive of machinery. Power plant will develop 350 horsepower.

HARRISBURG.—Citizens have petitioned the county court to build a bridge across the Willamette river.

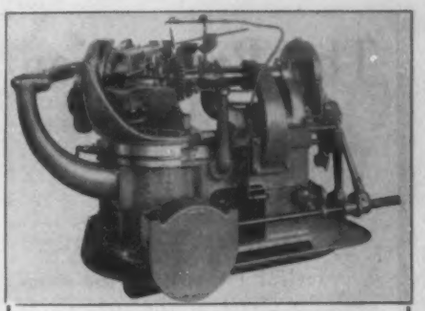
FLORENCE.—Tidewater Mill Co. will close down soon for repairs and new machinery.

FLORENCE.—J. P. Porter, of Porter Bros. lumber mill, says a large amount of new machinery will be purchased soon.

PAISLEY.—An application for an electric power, heat and light franchise has been filed with council by C. R. Potts. Mr. Potts has filed on power site on Chewaucan river where 200 horsepower will be developed.

PORTLAND.—The council will ask the people to vote $50,000 in bonds for a municipal asphalt repair plant.

PORTLAND.—Bids will be received by the Port of Portland until Nov. 24 for the construction of a new steel hull for the dredge



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CLEVELAND, OHIO

Columbia, at an estimated cost of $50,000.

PORTLAND.—This county (Multnomah) has voted $1,250,000 in bonds to assist in the construction of the interstate bridge across the Columbia river, between Vancouver, B. C. and Portland.

PORTLAND.—The following bond issues have been voted on favorably by the people for the state university; $100,000 for modern fireproof administration building; $30,000 for repairs to library; $15,000 repairs to engineering building; $10,000 for new heating plant, and $20,000 for other repairs.

PENNSYLVANIA

ELWOOD CITY.—The Calvert Wire Co., formerly located at Braddock, Pa., has erected a modern concrete plant on property formerly owned by the Tindel-Morris interest.

ERIE.—The Griffin Mfg. Co. is erecting an addition to its plant at an approximate cost of about $2,500.

ERIE.—The Heisler Locomotive Works plans to erect a brick and steel, 50 x 150-foot addition, work on which has already been commenced. Estimated cost $8,000.

ERIE.—The Erie Nut & Bolt Co. has been incorporated; capital $100,000; incorporators, Lincoln Davis, Providence, R. I.; Alexander Chandler, New York; Julian Burdick, New York.

INDIANA.—Deeds for 133 tracts of coal land, valued at about $1,000,000, has been filed here in favor of the Manor Real Estate & Trust Co., of Philadelphia, for coal lands bought in Greene township from the Greenwich Coal & Coke Co. and Benjamin S. Carskadden.

KOPPEL.—The Elwood & Koppel Bridge Co., capital $10,000, has been incorporated to build a bridge over the Beaver river. Incorporators: William McBride, Sewickley; T. L. Bedell, McKeesport; C. M. Walsh, Pittsburgh; Harrison Bock, Sharpsburg; D. C. Wiseman, Bellevue.

LANCASTER.—The Lowell Harness Co. plans to erect a three-story factory.

NEW KENSINGTON.—It is rumored that the Pennsylvania railroad plans to build a $50,000 bridge here to eliminate a grade crossing. Alex. C. Shand, Philadelphia, chief engineer.

PHILADELPHIA. — The Pennsylvania Grinding Wheel Co. has been incorporated; $10,000; by S. S. Sadtler, Springfield, Pa.; S. Bryan Smith, Merchantville, N. J.; Harry L. Hackett, Philadelphia; F. Bancroft, Camden, N. J.

PITTSBURGH.—The plant of the G. A. Schnabel & Sons Co., auto and wagon repair company, was recently damaged by fire. Estimated loss, about $50,000.

PITTSBURGH.—The Cooke-Wilson Electric Supply Co., Imperial Power building, this city, has bought property on Rebecca street, North Side, and will erect a five-story concrete building, to be used for manufacturing, storage and office purposes.

PITTSBURGH.—The United Engineering & Foundry Co. has received a contract from the Broken Hill Proprietary Co., Ltd., New Castle, New South Wales, for a three stand 28-inch rail mill, designed also to roll structural steel. The mill is similar to one installed several years ago for the Jones & Laughlin Steel Co. The contract includes two traveling tables, cooling beds, runout with saws and a finishing department.

PUNXSUTAWNEY.—Work of erecting 200 coke ovens at the Cascade Coal & Coke Co.'s plant, is rapidly nearing completion. A new boiler house and power plant and a new steel and concrete bin are included in the improvements.

ROYERSFORD.—The Progressive Knitting Mills will erect a 50 x 140-foot, three-story factory.

SOUTH CAROLINA

SUMTER.—The main building of the plant of McIver's Sash & Door factory was recently damaged by fire, entailing a loss of about $10,000.

TEXAS

AMARILLO.—Wolfin Bros., agents for the Buick motor car here, recently awarded the contract for a 90 x 140-foot machine shop.

AUSTIN.—An election will be held for issuing $125,000 in municipal bonds; $50,000 will be used for an abattoir and $25,000 for a fire alarm system.

CENTER.—The depot and warehouse of the Gulf, Colorado & Santa Fe railroad were recently damaged by fire. Estimated loss about $50,000.

DALLAS.—The Wesson Foundry Co. plans to rebuild its foundry recently damaged by fire. Equipment costing $3,000 will be installed.

HOUSTON.—An election will be called for the issue of bonds for the construction of two dredge boats on the Ship canal at a cost of about $200,000.

SCHULENBURG.—G. E. Ruhman plans to erect a plant for the manufacture of sheet metal articles and is in the market for machines for cutting, rolling and stamping same.

VIRGINIA

LACROSSE.—P. W. Smith & Co. has been incorporated to manufacture furnaces and ranges; $250,000; by B. W. Smith, D. A. Montgomery, Lacrosse, and J. M. Fere, Wilmington, Del.

RICHMOND.—The Henrico Iron Works has been incorporated; $25,000; by M. A. Finn, president, Petersburg, and Stuart Johnson, secretary and treasurer, Richmond.

ROANOKE.—The Henry Mining Co. has been incorporated; $25,000; by W. C. Boswell, president, and J. S. Shereritz, secretary.

WASHINGTON

CANBY.—Work has begun on rebuilding Stefani lumber mill recently destroyed by fire, with a loss of $10,000. New machinery will be purchased.

CENTRALIA.—The intake and right-of-way 14 miles in length have been purchased by the council for municipal water system estimated to cost $134,000. Stanley Macomber, city engineer. First bids will be asked for in December.

CHEHALIS.—The city council is considering plan to install fire alarm system.

HOQUIAM.—The National Lumber & Mfg. Co. has been incorporated; $1,500,000; by Henry Wicks, Youngstown, O.; John A. Finch, Chas. Hussey, W. J. C. Wakefield, Spokane; W. B. Mack, Aberdeen; A. L. Paine and Thos. W. Tebb, Hoquiam.

KIRKLAND.—Citizens voted Nov. 15 on $18,250 bond issue to purchase water system.

LEAVENWORTH.—The Tumwater Light & Power Co. has been granted franchise for light and telephone poles and wires in this city.

SEATTLE.—The Kougarek Dredging Co. has been incorporated for $500,000 by W. A. Brown, K. Knott and others.

SEATTLE.—The contract for boilers for city tuberculosis hospital has been awarded to Eckhart Plumbing & Heating Co., at $18,242.

SEATTLE.—The city utilities committee of council has voted to recommend for passage the bill providing for immediate construction of first unit of auxiliary light plant.

SEATTLE.—The Seattle Brewing & Malting Co. has taken out permit for a new bottling works, to cost $22,000. New equipment will be purchased.

SEATTLE. — Plans for 150-foot concrete lined shafts and 900-foot tunnel under Lake Union for water mains have been finished by City Engineer Dimock. Estimated cost $300,000.

SPOKANE.—The Inland Brewing & Malting Co. will build a cold storage plant. Cost $20,000.

SPOKANE.—Ordinances calling for sewer and water main improvements have passed council.

SPOKANE.—The Western Cereal Co. has been incorporated for $500,000; by W. C. Adams, A. S. Sherlock, et al.

SPOKANE.—Articles of incorporation have been filed for the Vulcan Copper Works; inc., $1,500,000; by J. R. Brown, H. L. Rodgers, et al.

SPOKANE.—Plans are finished for hydro-electric development below Bowl and Pitcher Rapids by Spokane Western Power & Traction Co., to supply manufacturing plants in that locality. About 8,000 horsepower will be had.

SUMAS.—The shingle mill of Hagen & Van Over has been purchased by Cochran & Donahue, Ballard street, Seattle, and the capacity will be doubled.

TACOMA.—The water department is considering building a 150-foot standpipe at Sixty-third street and Park avenue at a cost of about $10,000.

TACOMA.—The council has signed a lease with G. L. Casey, an eastern foundryman, for a site on city property on middle waterway for an electric pig iron smelter. The German system of smelting iron by electricity will be used exclusively.

TACOMA.—A six-months permit has been issued to the Seattle-Tacoma-Olympia Railroad Co. to build a "Sande" system mono-rail railroad in the city limits as the first unit of a proposed Tacoma-Seattle interurban. If the line is finished at the expiration of the permit, a permanent franchise will be granted.

TOLT.—The Tolt Water, Light & Power Co. has been incorporated; $70,000; by R. B. McAdams and Robert McMurchie.